NEUROCOGNITIVE FUNCTION AND QUALITY OF LIFE IN PATIENTS WITH CLINICALLY STABLE SCHIZOPHRENIA AND EUTHYMIC BIPOLAR AFFECTIVE DISORDER

Submitted

BY

Dr. POORANI. G MBBS

Dissertation submitted to

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY, CHENNAI,

In partial fulfillment of the requirements for the degree of

DOCTOR OF MEDICINE IN PSYCHIATRY

Under the guidance of

Dr. I. ANAND

Professor

DEPARTMENT OF PSYCHIATRY

PSG INSTITUTE OF MEDICAL SCIENCES AND RESEARCH

COIMBATORE

DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled "**Neurocognitive function and Quality of life in patients with clinically stable Schizophrenia and Euthymic Bipolar Affective Disorder."** is a bonafide and genuine research work carried by me under the guidance of Dr. I. Anand, Professor, Department of Psychiatry, PSGIMS & R, Coimbatore.

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PROFESSOR

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ENDORSEMENT BY THE HOD/PRINCIPAL OF THE INSTITUTION

This is to certify that this dissertation **"Neurocognitive function and Quality of life in patients with clinically stable Schizophrenia and Euthymic Bipolar Affective Disorder"** is a bonafide research work done by **DR. POORANI. G** under the guidance of **Dr. I. ANAND**, Professor & Head, Department of Psychiatry, PSGIMS&R, Coimbatore.

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PLACE:

ACKNOWLEDGEMENT

At the outset, I thank God for giving me the strength to perform all my duties.

It is indeed a great pleasure to recall the people who have helped me in the completion of my dissertation. Naming all the people who have helped me in achieving this goal would be impossible, yet I attempt to thank a selected few who have helped me in diverse ways.

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Finally I thank my patients who formed the backbone of this study without whom this study would have not been possible.

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February 21, 2014

To
Dr G Poorani
Postgraduate
Department of Psychiatry
PSG IMS & R
Coimbatore

Ref.: Proposal titled: *"Neurocognitive function and quality of life in patients with clinically stable schizphrenia and euthymic bipolar affective disorder"*

Sub.: Ethics Committee Approval for the study

The Institutional Human Ethics Committee, PSG IMS & R, Coimbatore -4, has reviewed your proposal on 28th January, 2014 in its full board review meeting held at College Council Room, PSG IMS&R, between 2.00 pm and 4.15 pm, and discussed your application to conduct the study entitled:

"Neurocognitive function and quality of life in patients with clinically stable schizphrenia and euthymic bipolar affective disorder"

The following documents were received for review:

1. Duly filled application form
2. Proposal
3. Informed Consent forms
4. Data Collection Tool
5. CV
6. Budget

The members who attended the meeting at which your study proposal was discussed are as follows:

Sl. No.	Name of the Member of IHEC	Qualification	Area of Expertise	Gender	Affiliation to the Institution Yes/No	Present at the meeting Yes/No
1	Dr. S. Bhuvaneshwari (Member-Secretary, IHEC)	MD	Clinical Pharmacology	Female	Yes	Yes
2	Mrs. Geetha S Kannan	+ 2	Lay person	Female	No	Yes
3	Mr Gowpathy Velappan	BA., BL	Legal Advisor	Male	No	Yes
4	Mrs G Malarvizhi	M Sc	Nursing	Female	Yes	Yes
5	Mr. R. Nandakumar (Vice-Chairperson, IHEC)	BA., BL	Legal Expert	Male	No	Yes
6	Dr. G. Rajendiran	DM	Clinician (Cardiology)	Male	Yes	Yes
7	Dr. V. Ramamurthy	Ph D	Biotechnology	Male	Yes	No

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8	Dr. M. Ramanathan	M Pharm, Ph D	Non-Medical (Pharmacy)	Male	Yes	Yes
9	Dr. P. Sathyan (Chairperson, IHEC)	DO, DNB	Clinician (Opthalmology)	Male	No	Yes
10	Dr. Seetha Panicker	MD	Clinician (Obstetrics & Gyanaecology)	Female	Yes	No
11	Dr. S. Shanthakumari	MD	Pathology, Ethicist	Female	Yes	Yes
12	Dr. Y.S. Sivan	Ph D	Social Scientist (Sociology)	Male	Yes	Yes
13	Dr. Sudha Ramalingam (Alternate Member-Secretary, IHEC)	MD	Public Health, Epidemiology, Genetics, Ethicist	Female	Yes	Yes
14	Mrs. K. Uma Maheswari	M Sc, M Phil. B Ed	Botany	Female	No	Yes
15	Dr. D. Vijaya	M Sc, Ph D	Basic Medical Sciences (Biochemistry)	Female	Yes	Yes

After due consideration, the committee has decided to approve the above proposal.

The approval is valid for one year.

We request you to intimate the date of initiation of the study to IHEC, PSG IMS&R and also, after completion of the project, please submit completion report to IHEC.

We hereby confirm that neither you nor any of your study team members have participated in the voting/ decision making procedure of the committee. The members of the committee who have participated in the voting/ decision making procedure of the committee do not have any conflict of interest in the referenced study.

This Ethics Committee is organized and operates according to Good Clinical Practice and Schedule Y requirements.

Non-adherence to the Standard Operating Procedures (SOP) of the Institutional Human Ethics Committee (IHEC) and national and international ethical guidelines shall result in withdrawal of approval (suspension or termination of the study). SOP will be revised from time to time and revisions are applicable prospectively to ongoing studies approved prior to such revisions.

PIs are required to send progress reports (in the form of an extended abstract with publications if any) to the IHEC every six months (and a month before expiry of approval date, if renewal of approval is being sought).

Request for renewal must be made at least a month ahead of the expiry of validity along with a copy of the progress report.

22/2/14.

Dr Sudha Ramalingam
Alternate Member - Secretary
Institutional Human Ethics Committee

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INDEX

ABSTRACT:

BACKGROUND:

Neurocognitive dysfunction is seen in both schizophrenia and bipolar affective disorder which is persistent even during the remission period. Quality of life is also affected in patients with neurocognitive dysfunction. Literature predominantly includes studies addressing either one of the two diseases and only few studies compared schizophrenia and bipolar affective disorder during clinically stable period. Hence identifying and comparing the neurocognitive dysfunction between the two major psychiatric illnesses and addressing them would improve treatment outcomes and overall well being.

AIM OF THE STUDY:

- The aim of the study is to assess and compare the neurocognitive functions among patients with clinically stable schizophrenia and euthymic bipolar affective disorder.
- To compare the quality of life in the above illnesses.

METHODS:

Cross sectional study involving patients with schizophrenia who are clinically stable and bipolar affective disorder, currently in remission and other selection criteria were included after written informed consent. Standard neuropsychological assessment battery and quality of life scale was administered to all the subjects.

RESULTS:

Neurocognitive dysfunction was observed in both schizophrenia and bipolar affective disorder patients included in the study. There were deficits in all the neurocognitive domains such as speed, attention, executive function, verbal learning and memory, visuospatial construction and visual memory in both the groups of patients. When comparing the two groups there was no significant difference observed in the neurocognitive functions and quality of life. Sub analysis within the groups in the category of duration of illness in schizophrenia and number of affective episodes in bipolar affective disorder did not show any statistically significant difference in neurocognitive domains.

INTRODUCTION:

Schizophrenia is characterized by disordered cognition, including

- "gain of function" in psychotic symptoms
- "loss of function" in specific cognitive functions such as working and declarative memory
- But without the progressive dementia that characterizes classical neurodegenerative disorders.

Bipolar affective disorder

Bipolar affective disorder is a major psychiatric illness characterized by episodes of affective illness which can be mania, hypomania, depression and mixed affective states.

QUALITY OF LIFE:

Quality of life is defined by the World Health Organization as "Individuals' perceptions of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns."

NEUROCOGNITION:

Neurocognition in a broad sense means information processing.

It denotes a relatively high level of processing of specific information including thinking, memory, perception, motivation, skilled movements and language.

Some of the major components of neurocognition includes :

- Speed
- Attention
- Executive function
- Learning and memory
- Visuo spatial construction
- Visual memory

SPEED:

Speed may be assessed by motor speed and mental speed.

Several brain structures are involved in mediating motor speed.

Prefrontal cortex – motor planning

Supplementary motor area – initiation of motor acts

Premotor cortex, basal ganglia, cerebellum – fine motor control

Integration of multiple brain centres are needed to mediate movement. Motor speed is the reflector for efficiency of this integration.

Mental speed requires rapid processing of information. It is a composite measure. Coordination of different brain areas is required for information processing speed even at low levels of stimulus complexity.

Digit substitution test is a test used to assess mental speed. It assesses the motor persistence, sustained attention, visuomotor coordination and response speed.

ATTENTION:

Attention is an important element of cognition. Attention is characterized in two ways – as a resource and as a skill of resource deployment.

Three different types of attention:

- Focused attention
- Sustained attention
- Divided attention

Focused attention is the capacity to perform a task in the presence of distracting stimuli.

Example: listening to a conversation at a railway station.

Sustained attention is the capacity to attend to the task in hand for a required period of time.

Example: listening to a lecture for an extended period of time.

Divided attention is the capacity to attend two or more tasks simultaneously.

Different brain areas mediate attention depending on the type.

The capacity to inhibit response to stimuli which is irrelevant to the task is mediated by orbito-frontal area in prefrontal cortex. Hence orbito-frontal area mediates focused attention.

The right fronto parietal area mediates sustained attention.

Divided attention is mediated by anterior cingulate and the dorsolateral prefrontal cortex. Divided attention is related to the central executive function of the working memory.

Digit vigilance test assesses the sustained attention.

EXECUTIVE FUNCTIONS:

Executive function comprises anticipation, planning, goal selection and monitoring.

It is defined as the ability to maintain an appropriate problem solving set for the attainment of future goals. Executive functions involve an intention to inhibit a response or to defer it to a later appropriate time; a strategic plan of action sequence; a mental representation of the task, including the relevant stimulus information encoded into the memory and the desired future goal state.

Executive functions include working memory, fluency, planning, set-maintenance, set shifting ability, response inhibition, abstraction, error detection and organization.

Fluency:

Fluency refers to intrinsic generation of responses, typically within a set of constituents. The capacity to generate alternatives in a regulated manner is measured by fluency.

Fluency can be measured in both verbal and visual modalities.

Verbal fluency activates prefrontal cortex in the language dominant hemisphere while visual modality activates bilateral prefrontal areas. Temporal lobe involvement is seen in category fluency.

Verbal fluency: the capacity to generate new words in a regulated manner.

Controlled oral word association test measures the phonemic fluency.

Animal naming test measures the category fluency.

Category fluency is a form of verbal fluency. Here the content of the words is regulated. In the animal naming test the subject generates names of animals in one minute which belong to a particular semantic category.

Working memory:

Working memory refers to the capacity to hold and manipulate information for ongoing process. Working memory is needed to integrate the information with long term memory.

Three components of working memory include:

- Verbal working memory
- Visuospatial working memory
- Central executive

The verbal working memory involves a phonological loop. It is a limited duration passive store for phonological code. There is an articulatory rehearsal process that refreshes the phonological buffer.

The visuospatial buffer is responsible for initial recognition and registration of non-verbal material. The visuospatial sketchpad has a mechanism through which the spatial information is rehearsed.

The central executive coordinates the above two systems, focuses and switches attention and then activates the long term memory for representation.

Verbal working memory activates the Broca's area, left supplementary motor and premotor areas.

Verbal items- left posterior temporal areas

Phonological information – left supramarginal gyrus, left dorsolateral prefrontal cortex

Articulatory processes- Broca's area

Externally guided working memory:

This refers to the working memory that is utilised when stimuli whose order of recall is predetermined are presented to the subject in quick succession.

Internally guided working memory:

This refers to the working memory that is utilised when stimuli whose order of recall is not predetermined are presented to the subject in quick succession.

The N Back test has two versions namely 1 Back and 2 Back. The 1 back version need verbal storage and rehearsal while the 2 Back version needs in addition to the above, manipulation of information.

1 Back test involve articulatory loop in verbal stimulus.

2 Back test involve the central executive.

Response inhibition:

Response inhibition measures the ease with which a perceptual set can be shifted both to conjoin changing demands and by suppressing a habitual response in favour of an unusual one.

The prefrontal cortex is essential for response inhibition.

Stroop test is used to measure response inhibition.

LEARNING AND MEMORY:

Learning and memory are the capacities by which a subject is able to gain experience and retain it.

Learning is the means of acquisition of new information regarding the environment.

Memory is the process of retaining what is learned.

Memory includes short term memory and long term memory.

Long term memory is a system of theoretically unlimited capacity enduring over the lifetime of an individual.

Declarative or explicit memory is the memory that can be brought to conscious awareness. Memory for words, scenes, figures, events and facts are in the domains of explicit memory.

Episodic memory is the encoding and retrieving of personally experienced events.

Semantic memory is the knowledge of facts and concepts.

Learning is mediated by various structures of brain such as amygdale, hippocampus, anterior temporal cortex, entorhinal cortex, retrosplenial cingulate cortex and prefrontal cortex.

Episodic and semantic memory involves left prefrontal cortex. Retrieval from episodic memory involves right prefrontal cortex.

Rey's auditory verbal learning test is used to measure the learning and memory for word lists.

VISUO CONSTRUCTIVE ABILITY:

This is the ability to construct a design, using either a paper and pencil or sticks or blocks. Visually perceived form can be translated into a two dimensional figure or three dimensional object by the visuo-constructive ability.

Visuo-constructive ability requires the following:

- Attention
- Planning
- Visuo-spatial perception
- Visuo-motor coordination
- Error correction abilities

This is a composite function. This function is mediated by bilateral parietal lobes especially the right parietal lobe.

The prefrontal cortex mediates visuo-constructive ability indirectly by mediating error correction and planning.

Complex figure test is the test used to measure the visuo-constructive ability.

REVIEW OF LITERATURE:

NEUROCOGNITION AND QUALITY OF LIFE IN SCHIZOPHRENIA:

Neurocognitive dysfunction is a core feature of schizophrenia.

Emil Kraeplin coined the word “dementia praecox” which is characterised by early psychosis and cognitive deterioration. In 1911 Bleuler termed the disease as schizophrenia. He emphasised that there is lack of connection between thought, perception and affect.

Since then there has been a waxing and waning of the interest in neurocognition in schizophrenia.[11]

In the past two decades there is re-emergence of the importance of neurocognitive function in schizophrenia and various researches are done in this area. [11]

There are five different domains in the psychopathology of schizophrenia.

They include the following:

- Positive symptoms
- Negative symptoms
- Aggressive symptoms
- Cognitive symptoms
- Affective symptoms

Cognitive function has become a separate domain in the psychopathology of schizophrenia. It is significantly linked with the quality of functioning. Cognitive impairment is seen at the onset and throughout the illness course.[14]

In schizophrenia the neurocognitive deficits are found to be stable throughout the course of illness. [13]

Neurocognition includes the following possible domains such as:

- perceptual organisation
- visual memory
- auditory memory
- working memory
- processing speed

In schizophrenia there is broad deficit in all the above domains but there are some theories which focus on specific domains such as executive functions, verbal memory and working memory. This has implications towards etiology of the illness. [11]

There are impairments in several cognitive domains which are evidenced by various cognitive tests.

Magnitude of cognitive symptoms:

The deficit ranges between moderate to severe magnitude. Some studies estimated that a significant number of schizophrenia patients are in the normal range of neurocognition. It is also said that these normal range people had better cognition premorbidly and there is a decline in the level of cognition. Cognitive symptoms are not correlated with positive symptoms but have mild correlation with negative symptoms.[11]

The neurocognitive domains such as attention, language skills, working memory and executive functioning are found to be affected moderately.

The memory and verbal learning are found to be affected severely. These domains of neurocognition are associated with social and adaptive skills. [14]

Duration of illness and cognitive symptoms:

In a study of patients with first episode psychosis, the cognitive deficits were found in the domains of executive function, processing speed and verbal memory. Their visuospatial memory was not affected. [12]

In chronic schizophrenia, patients performed poorly in all the neurocognitive domains. This was matched with age, gender and education.[13]

Factors associated with neurocognitive impairment:

Some of the factors associated with neurocognitive impairment are

- Age
- Gender
- Level of education. [13]

In gender, males are found to have more impairments than females.

In age, increasing age was found to have poor performances in memory, attention and executive functions.

In the level of education, more the years of education less the cognitive impairments.

Negative symptoms and cognitive symptoms:

Negative symptoms and neurocognition were considered integral but there is definite difference between the two domains. [11]

Negative symptoms are correlated with cognitive symptoms but there are differential pathways of change after treatment. It is now clear that the deficits measured in neurocognitive tests are not correlated with positive symptoms, negative symptoms or with antipsychotic medications.[14]

Neurocognitive function and quality of life:

Outcome in schizophrenia is important in schizophrenia as with the advent of antipsychotics patients are becoming more productive to such an extent that they reach their premorbid self. In such patients who respond well to treatment improve in their positive and aggressive symptom domains but the cognitive functions seem to be stable throughout the illness. As thought earlier the second generation antipsychotics failed to show any improvement in cognitive functions.

Hence in patients who respond well to antipsychotics still have poor outcome and this can be attributed to the cognitive dysfunction.

Outcome of illness includes various domains of which quality of life plays a major role. Since neurocognitive dysfunction can predict the outcome of illness, it can predict the quality of life of a patient.

Neurocognitive deficits in schizophrenia are a major contributing factor to the inability to function efficiently in day to day life that is commonly seen in people affected with schizophrenia.

Cognitive functions are one of the best predictors of outcome in adaptive function. There are datas that cognitive dysfunction is the core feature of schizophrenia and the severity of it is predictive of the course of illness.[14]

Outcome in schizophrenia depends on various factors and now cognitive function has become an important variable in defining the outcome. Cognitive functions have a link between disability, dysfunction, symptomatology and biological changes. One of the major concerns about cognitive dysfunction is the treatment of it. Use of cognitive enhancers may become an important focus of treatment in the future. [14]

Neurocognitive functions are very important in various fields such as genetics, epidemiology, pharmacology and neuro-imaging. Researchers are expecting at the possibility of prevention and reversibility of cognitive dysfunction. [14]

Duration of untreated illness and severity of illness are correlated with the cognitive functions thereby with the level of functioning. [14]

Studies have implicated a strong relationship between real life functioning and neurocognition. [11]

Studies have shown that there is longitudinal correlation between cognition and functional outcome thereby quality of life. This suggests that cognitive deficits have important role in the rehabilitation of schizophrenia patients.[11]

The severity of cognitive deficits is a better predictor of functional outcome than that of the negative and positive symptoms. The patients with severe cognitive deficits in the first episode of the illness are likely to suffer a chronic and severe illness in the future.[14]

Cognitive domains are predictors of sustained employment, everyday activities and quality of life. Neuropsychological performance has little prediction about real world performance which is influenced further by depressive and negative symptoms. [14]

A meta-analysis of 26 randomized controlled trials done on cognitive remediation in schizophrenia showed that there was significant improvement in psychosocial functioning and cognitive performance. They conclude that cognitive remediation provides moderate improvement in cognitive performance and along with psychiatric rehabilitation it also improves functional outcomes. [15]

In the past two decades there is increasing interest in quality of life of schizophrenia patients.

Studies have found that quality of life is compromised in patients with schizophrenia. Quality of life is an important outcome of treatment of schizophrenia. The determinant of quality of life in schizophrenia is not well known. Studies have found negative correlations with psychiatric symptoms and the findings have been mixed and not consistent. Hence is has become difficult to determine the degree to which psychiatric symptoms are related to poor quality of life.[28]

A meta-analysis of 56 studies the relationship between quality of life with positive, negative and general psychiatric symptom was conducted. The study showed that only small relationship exists between quality of life and psychiatric symptoms. Among these the positive and negative symptoms showed strong relation to poor quality of life while general psychopathology showed negative relationship which was consistent. [28]

NEUROCOGNITION AND QUALITY OF LIFE IN EUTHYMIC BIPOLAR AFFECTIVE DISORDER:

Neurocognitive deficits are observed in all bipolar affective disorder patients, both during symptomatic and euthymic period. Verbal memory and executive functions are the two domains affected in comparison to healthy individuals. The verbal memory is affected more in remission period during which the daily functioning becomes a concern. Neuropsychological rehabilitation can benefit such patients. [17]

About two-thirds of patients with bipolar disorder do not achieve complete recovery in social and occupational functioning thereby did not return to their premorbid level of functioning. Neurocognitive deficits are the contributing factor for this functional impairment.[20]

Studies found that there is significant impairment in verbal memory and executive functioning in manic and depressive state of bipolar disorder patients. Later when these patients were followed up during the euthymic phase they found that the cognitive impairments persisted in the first and second years after remission. [20]

Literature reviews reported that processing speed and executive functioning remains impaired over time in patients who were euthymic and also received treatment.[20]

Functional remediation programs showed improvement in psychosocial functioning. A small proportion of about 5 % of the patients who received this remediation program were able to go to job. The major groups included cognitive, occupational, autonomy and leisure domains.[20]

The degree of cognitive impairment in various types of bipolar disease was not significant when compared to normal healthy controls. One of the predictors of cognitive impairment includes antipsychotic medications. Also presence and absence of psychotic symptoms have no role in determining the degree of cognitive dysfunction.[20]

Structural abnormalities are seen in the brains of patients with bipolar disorder and there is some positive association between neurocognitive impairments and structural abnormalities. Volumetric studies in bipolar disorder patients show smaller temporal lobes.[21]

There is also evidence of positive correlation between number of episodes and neurocognitive impairments.[21]

The euthymic patients had significant neurocognitive deficits in the domains of verbal learning and memory. They had difficulties in recall and recognition which shows the difficulties in encoding and retrieval. In delayed recognition there was a negative correlation with duration of illness and number of affective episodes. This negative correlation with number of episodes explains that the greater the number of episodes, the greater the neurocognitive dysfunction. The hypothalamic- pituitary- adrenal axis mediated damage is a contributing factor to the neurocognitive impairment. [21]

AIM:

- The aim of the study is to assess and compare the neurocognitive functions among patients with clinically stable schizophrenia and euthymic bipolar affective disorder.
- To compare the quality of life in clinically stable schizophrenia and euthymic bipolar affective disorder.

METHODOLOGY:

Several domains of cognitive functions and quality of life were assessed in two groups of patients attending psychiatry outpatient department in PSG IMSR. Group A consists of patients with diagnosis of schizophrenia according to ICD 10 criteria, who are clinically stable. Group B consists of patients with diagnosis of bipolar affective disorder, currently in remission according to ICD 10 criteria.

The remission criteria for schizophrenia is according to the following criteria where for at least 1 month as measured by the Positive and Negative Syndrome Scale (PANSS), they presented a score ≤3 on items 1–3 of the positive subscale, on items 1, 4, and 6 of the negative sub-scale, and on items 5 and 9 of the general psychopathology subscale. The subjects who satisfied the above criteria were taken into the study.

Bipolar patients were euthymic, defined as a Young Mania Rating Scale score ≤6 and a Hamilton Depression Rating Scale score ≤7, for at least 1 month. The subjects who satisfy the above criteria were taken into study.

- Sample size: 25 patients in each group.

INCLUSION CRITERIA:

- Age 18 years to 60 years
- Patients who have given written informed consent
- Both sexes
- Patients who qualify for ICD 10 criteria for schizophrenia and bipolar affective disorder, currently in remission.
- Patient should not experience any active psychotic symptoms for at least previous 3 months.

EXCLUSION CRITERIA:

- Patient with significant co morbid organic conditions
- Substance dependence except nicotine dependence
- Low vision, color blindness
- Patients with significant movement disorder
- Mental retardation

STUDY DESIGN:

Cross- sectional study

Convenient - sampling.

STUDY PARTICIPANTS:

Patients who are attending psychiatric outpatient department of PSGIMSR who are qualifying according to the inclusion and exclusion criteria as mentioned.

STUDY LOCALE:

PSG IMSR outpatient - department.

SAMPLE SIZE ESTIMATION:

Considering the previous similar studies and the number f patients attending our OPD from the previous statistics, we decide to have a sample of twenty five patients in each group with a total of 50 patients.

The study was conducted from February 2014 to August 2014.

The study proposal was presented and ethics clearance was obtained from the institutional Human Ethics Committee –PSG IMSR.

The researcher underwent training for administering the neuropsychological assessment from a clinical psychologist who is holding a PhD in clinical psychology. The neuropsychological assessment administration was practiced in five normal volunteers and was supervised by the clinical psychologist.

The selected cases were then assessed for neurocognition and quality of life using the following:

1) Nneuropsychological battery of tests
2) WHO-QOL-BREF.

The following standardized well known tests are administered to assess various cognitive domains in the above two groups.

Name of the test	**Cognitive domain assessed**
Digit symbol substitution	Speed
Digit vigilance task	Attention
Animal naming test COWA Verbal N back test Stroop test	Executive functions
Auditory verbal learning test	Verbal learning and memory
Complex figure test	Visual spatial construction and visual memory

DIGIT SYMBOL SUBSTITUTION TEST:

The digit symbol substitution test is a test of motor persistence, visuo-motor coordination, response speed and sustained attention. Rapid information process is needed to do this test quickly and accurately. The test consists of a page with numbers 1-9 arranged randomly in 4 rows and 25 squares each. The subject substitutes each number with a symbol using a number-symbol key which is in the top of the page.

Procedure:

The subject is seated comfortably and the principle of the test is explained. Practice is given for initial ten squares and then the test commences.

Instructions:

There are 4 rows of digits in this page. There is a blank row below each digit. There is a symbol for each digit. You have to substitute a symbol for each digit and proceed row by row. Do as fast as u can.

Score:

The time taken to complete is noted.

Duration:

The test needs about seven minutes.

DIGIT VIGILANCE TEST:

The digit vigilance test has numbers 1-9 randomly placed and ordered in rows on a sheet. There are 50 rows and 30 digits per row. The level of attention deployment or mental effort should be the same over a time period. The subject has to focus around the target digits 1 and 5 among other distracting digits. Inability to focus and sustain attention leads to errors and increased time to complete the test.

Procedure:

The subject is asked to scan the page and cancel the target digits 1 and 5. He/she is asked to do it as fast as possible without missing the target or cancelling the wrong digits.

Instructions:

Please look at this page. There are many digits placed in rows randomly. Please cancel the numbers 1 and 5 as fast as you can. Do not miss any target numbers and do not cross other numbers.

Score:

The time taken to complete the test gives the score.

Duration:

This test takes around 15 minutes.

CONTROLLED ORAL WORD ASSOCIATION TEST (COWA):

The controlled oral word association test is to measure phonemic fluency. The subject generates words starting with the letters F, A, S. Names of numbers and proper nouns should be excluded. They should not repeat the same word with different suffix. The subjects who are not comfortable with English are asked to generate words in their own mother tongue, starting with the consonants 'Ka'. 'Pa', 'Ma'.

Procedure:

The subject is told to generate words for one minute each with the consonant F,S and A or Ka, Ma, Pa . A trial of practice is given with other consonant which is not used in this test.

Instructions:

I will give you one minute and within that you have to say as many words as possible with the starting with F/ A /S or consonants of 'Ka'. 'Pa', 'Ma'. You must not names of persons and places or repeat the same words.

Score:

The total number of words produced in one minute for each letter is noted and an average for three trials forms the score.

Duration:

This test takes about 5 minutes.

ANIMAL NAMING TEST:

Animal naming test measures category fluency. This is a form of verbal fluency. Here the content of the words are regulated. The subject needs to generate names of animals for one minute.

Procedure:

The subject is asked to tell as many names of animals as possible in one minute. They should exclude the names of birds, fish and snakes.

Instructions:

You have to say names of as many animals as possible in one minute. Please do not say the names of birds, snakes or fish.

Score:

The total number of new words gives the score.

Duration:

Approximate time taken is 2 minutes.

VERBAL WORKING MEMORY N BACK TEST:

Procedure:

Thirty consonants common to Indian languages are randomly ordered and are presented auditorily at the rate of one per second. Of the thirty consonants nine are repeated. In the 1 back test the subject responds whenever a consonant is repeated consecutively while in 2 back the subject responds after an intervening consonant.

Instructions:

1 back test:

I will say some consonants like ‘ka’ ‘pa’. Whenever you hear the the consonant is repeated consecutively, you have to tap the table. A practice of 4 consonants with 1 repeat is given.

2 back test:

Now i will say another set of consonants and this time you have to tap the table when the consonant is repeated after another consonant.

Score:

The number of hits and errors gives the score for each test.

Duration:

Take around twelve minutes.

STROOP TEST:

The stroop test is to measure the response inhibition.

Procedure:

The stimulus page is given to the subject. He / she should be asked to read it column wise as fast as possible. The time taken to read is noted. Then, the subject is asked name the colour of the printed word in columns. The time taken for this is noted.

Instructions:

You see this page of printed words in various colours. Read the columns of words as fast as possible. After this task next instruction is given. Now please read the name of the colour in which the word is printed as fast as possible.

Score:

The naming time and reading time is converted into seconds. The naming time is subtracted from the reading time to get the stroop effect score.

Duration:

The test takes about 15 minutes.

AUDITORY VERBAL LEARNING TEST:

The AVLT consists of words of familiar objects like tools, vehicles, animals and body parts. There are two lists A and B with 15 words each. List A words are presented at the rate of one word per second for 5 trials in the same order. After each trial the subject is asked to recollect as many words as possible without any cues. The responses are noted down by the examiner. After this List B is presented once and immediate recall is taken for it. List B is used as an inference. This is followed by asking the subject to recall List A. After 20 minutes where the patient is distracted with other activities, the subject is asked to recall the List A which gives the delayed recall.

Score:

The number of correctly recalled words in each trial gives the score. Long term percent retention is calculated using the formula: delayed recall score / trial 5 *100.

Duration:

This test takes about 20 minutes.

COMPLEX FIGURE TEST:

The complex figure test is a test for visual memory.

Procedure:

The complex figure is recollected by drawing from the memory. The subject is asked to recollect the figure two times. First is an intermediate recall after three minutes and second time is a delayed recall after 30 minutes.

Instructions:

Please draw the design which is copied previously on this sheet. Draw as much as you re-collect. After this task delayed recall is taken after 30 minutes.

Score:

A score of 0, 0.5, 1 or 2 is assigned to each unit of the complex figure. Score 2 is given for unit which is accurately drawn and correctly placed. Score 1 is given for unit which is accurately drawn but incorrectly placed. Score 0.5 is given for unit which is inaccurately drawn but not recognizable and incorrectly placed. Score 0 is given for unit which is inaccurate, incorrectly placed and unrecognizable.

Duration:

This test takes around 15 minutes.

WHOQOL-BREF:

The WHOQOL-BREF is a validated questionnaire used to assess the quality of life. This is a self rated questionnaire given to the patients. It consists of 26 questions with 5 options each. A Tamil version is administered to patients who are comfortable in Tamil. It is made by translating and back translating method.

Instructions:

These questions ask you how you feel about your quality of life and related aspects. Please answer all the questions given below. This is what you think for the past two weeks.

Duration:

The time taken is around 20 minutes.

STATISTICAL ANALYSIS:

Statistical analysis was done by using SPSS version.

Independent t test was employed to analyse the difference between the two groups. Chi square test was used when analysis was done within the group.

In all the analysis 2 – tailed level of significance was set up at p value < 0.005.

Bar diagrams and pie diagrams were used to represent the data analysis.

RESULTS:

The overall sample consisted of 50 patients. Among 50 patients, 25 had the diagnosis of schizophrenia who were clinically stable and 25 had the diagnosis of bipolar affective disorder, currently in remission.

SOCIODEMOGRAPHIC VARIABLES:

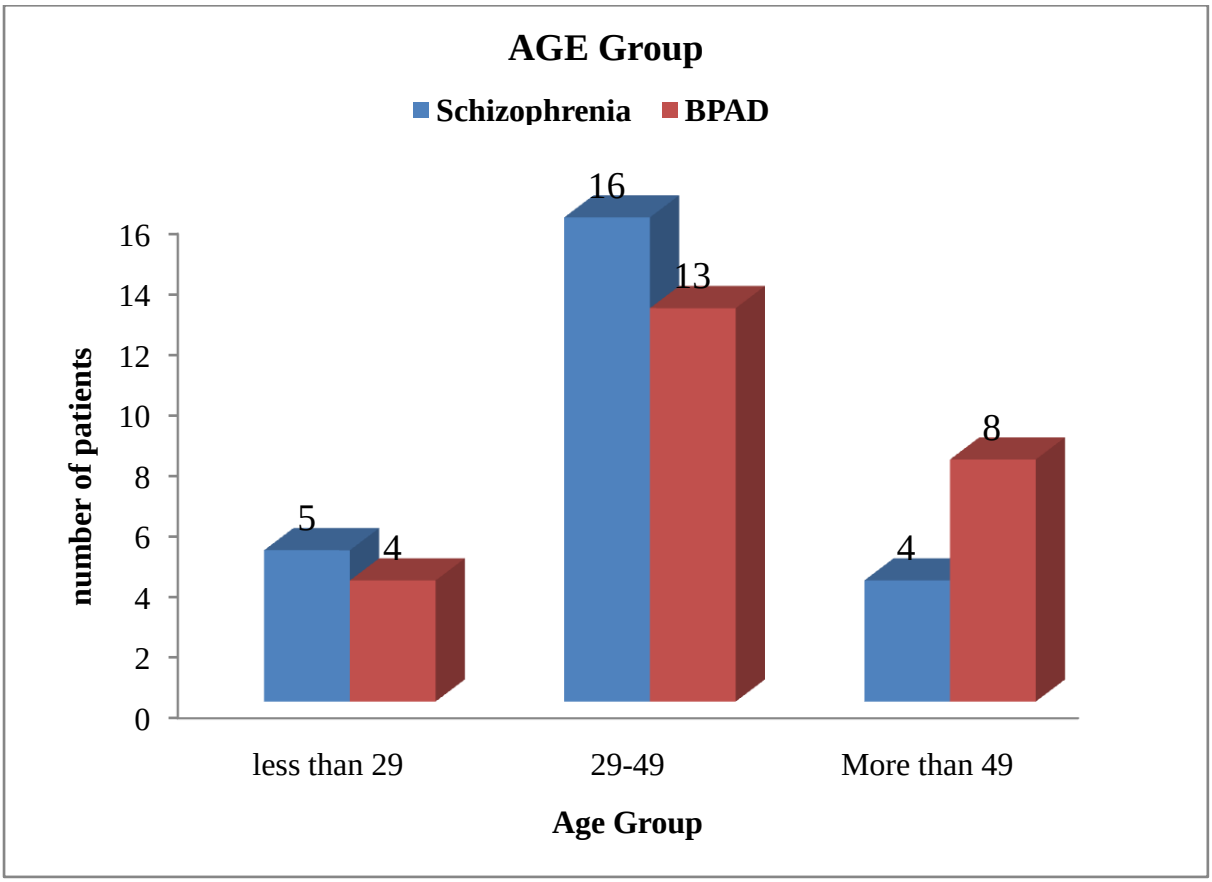
The socio-demographic variables include the following:

- Age
- Gender
- Education
- Marital status
- Duration of illness in schizophrenia
- Number of episodes in BPAD

AGE:

AGE	Schizophrenia	BPAD
	Percentage (%)	Percentage (%)
less than 29	20	16
29-49	64	52
More than 49	16	32
Total	100	100

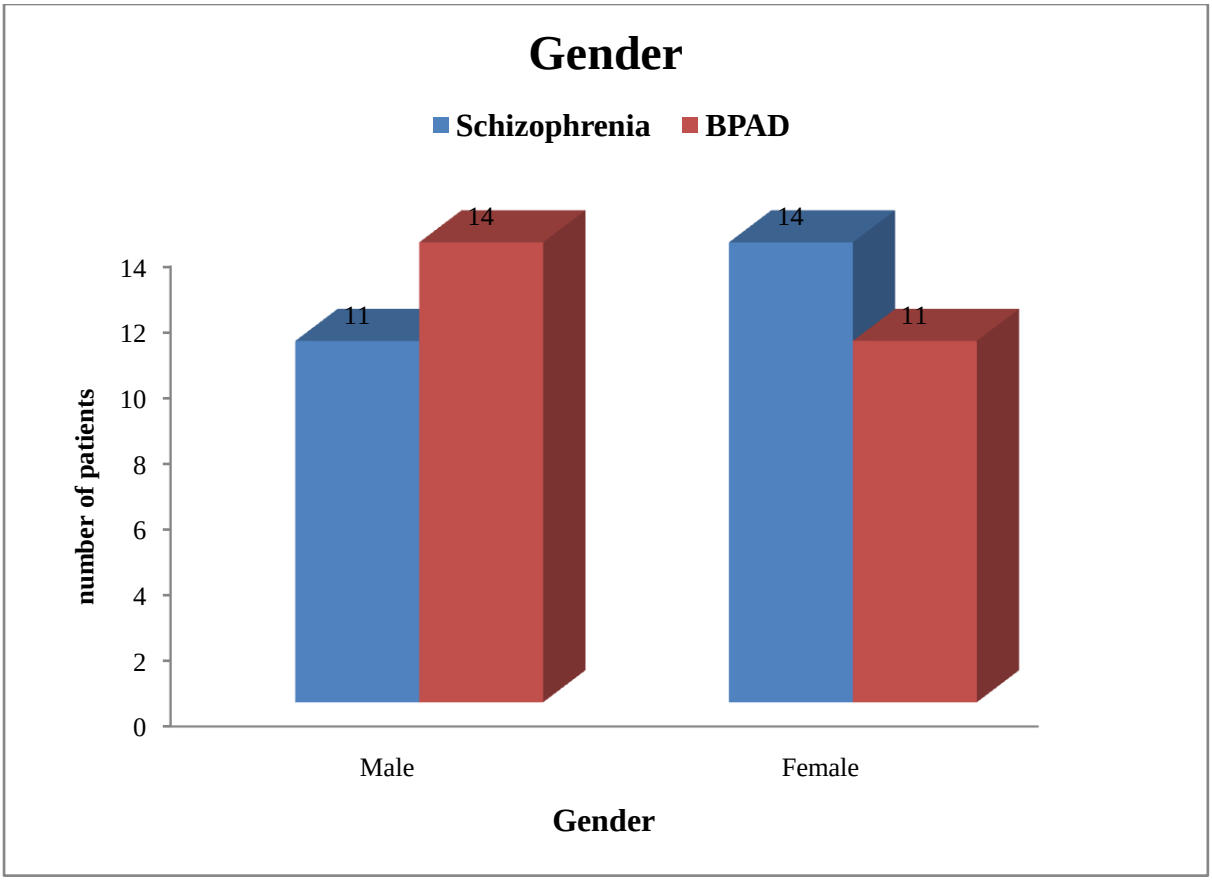
After grouping the age, in schizophrenia group, 16 patients fell in the age group of 29 to 49, comprising about 64% and the remaining 20% below 29 years of age and 16% were 49 and above. In BPAD group, 52% of patients fell in the age group of 29 to 49 and the remaining 16% below 29 years and 32% were 49 and above.



GENDER:

Gender	Schizophrenia	BPAD
	%	%
Male	44	56
Female	56	44
Total	100	100

In schizophrenia, 11 patients were male which is 44% and the remaining 56% were females. In BPAD 56% were males and 44% were females.

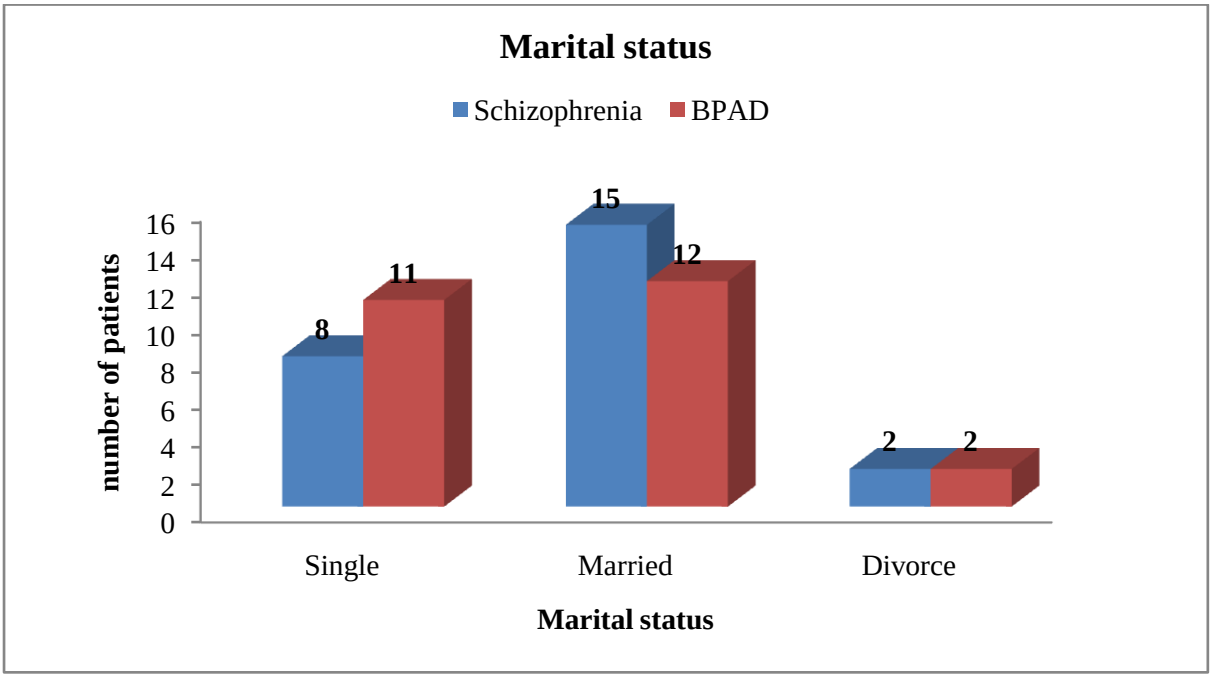


MARITAL STATUS:

Marital status	Schizophrenia	BPAD
	%	%
Single	32	44
Married	60	48
Divorce	8	8
Total	100	100

In schizophrenia 60% of patients were married, 32% of them were single and 8% were divorced.

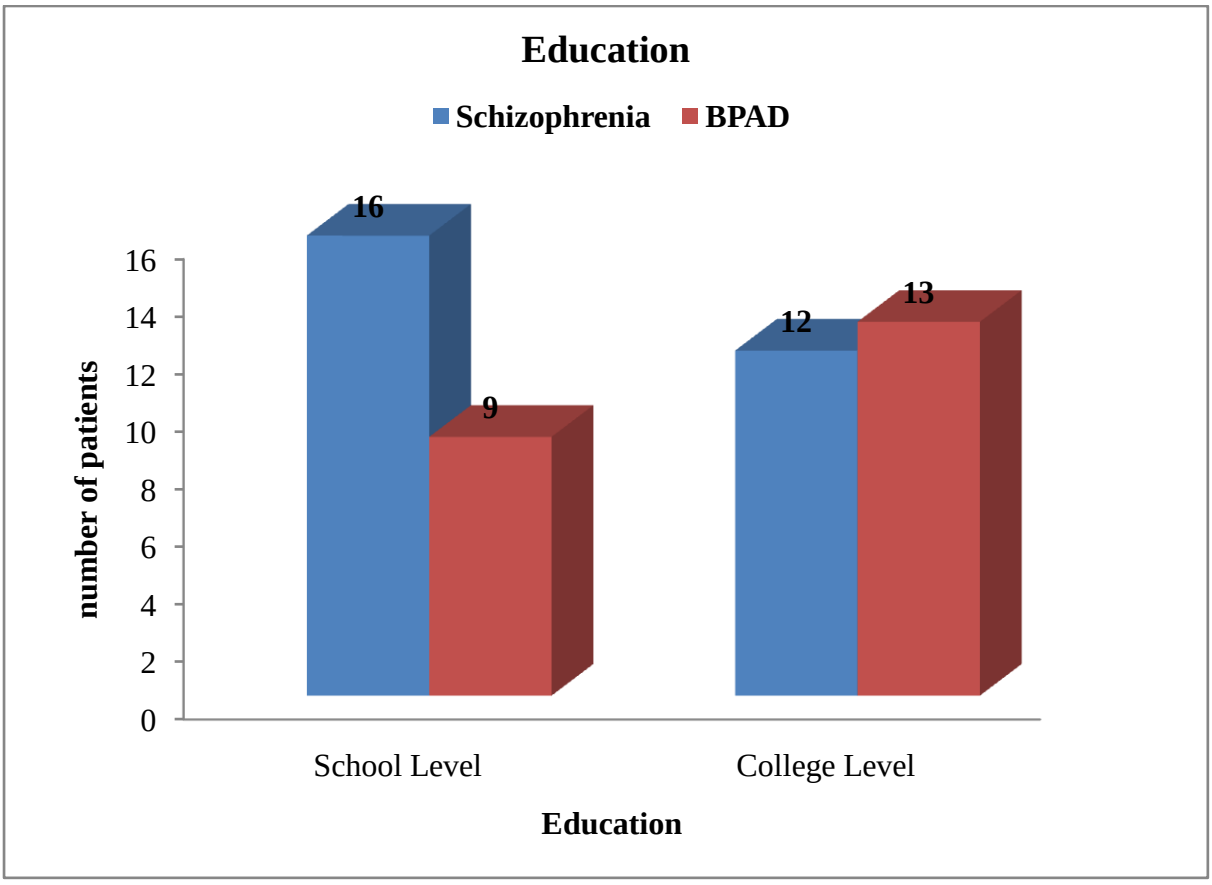
In BPAD, 48% were married, 44% were single and 8% were divorced.



EDUCATION:

Education	Schizophrenia	BPAD
	%	%
School Level	64	48
College Level	36	52
Total	100	100

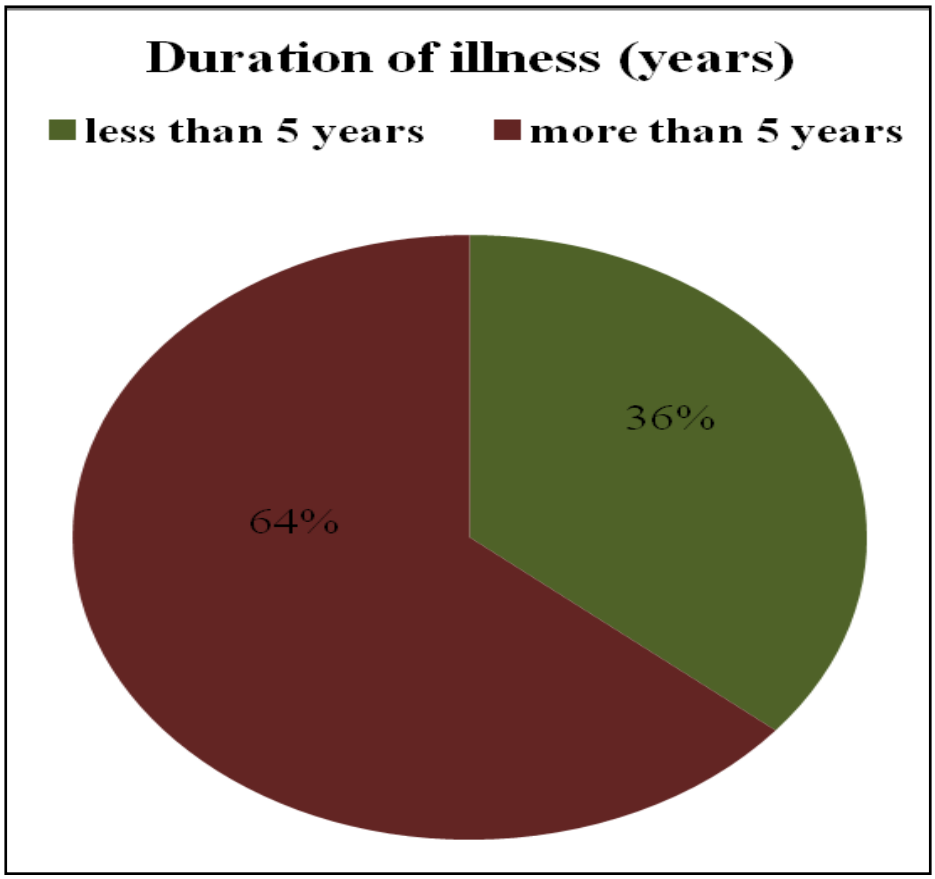
In schizophrenia, 16 of them, that is about 64% of patients were educated up to school level while 36% were college educated. In BPAD, 48% were school educated and 52% were college educated.



DURATION OF ILLNESS IN SCHIZOPHRENIA:

Duration of illness (years)	Frequency	Percent
Less than 5 years	9	36.0
More than 5 years	16	64.0
Total	25	100.0

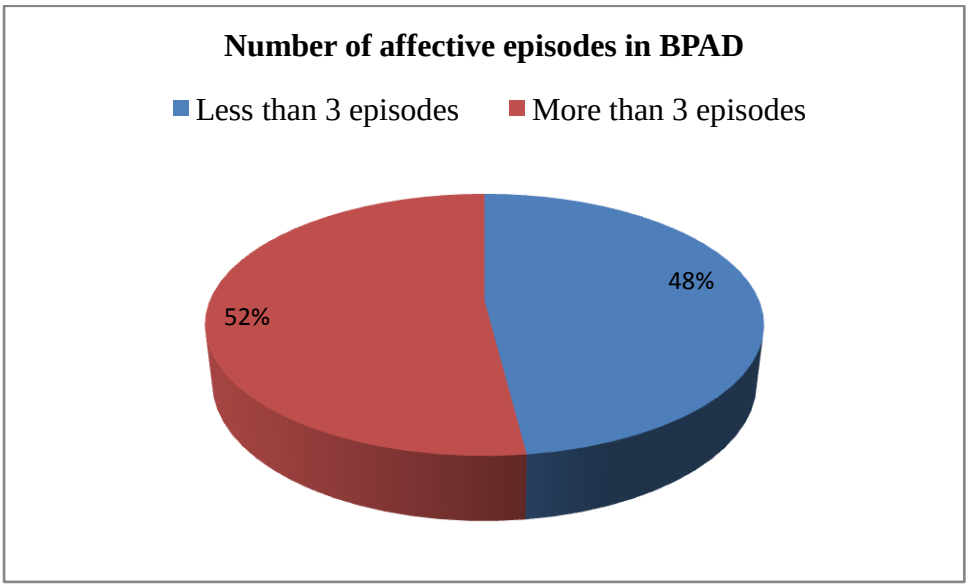
Among the 25 schizophrenia patients 16 of them had the illness for more than five years which is about 64% while the remaining 36% had the illness for less than five years.



NUMBER OF AFFECTIVE EPISODES OF ILLNESS IN BIPOLAR AFFECTIVE DISORDER:

Number of affective episodes	Frequency	Percent
less than 3 episodes	12	48.0
more than 3 episodes	13	52.0
Total	25	100.0

Among 25 BPAD patients 12 of them suffered less than three episodes of affective illness in the past which comprises 48% while the remaining 52% suffered more than three episodes of affective illness in the past.



The second part of results includes the following:

1) Comparative analysis of neurocognition between clinically stable schizophrenia and euthymic bipolar affective disorder groups

2) Comparative analysis of neurocognition and duration of illness in schizophrenia

3) Comparative analysis of neurocognition and number of affective episodes in bipolar affective disorder

4) Comparative analysis of quality of life between clinically stable schizophrenia and euthymic bipolar affective disorder

COMPARATIVE ANALYSIS OF NEUROCOGNITION BETWEEN SCHIZOPHRENIA AND BIPOLAR AFFECTIVE DISORDER:

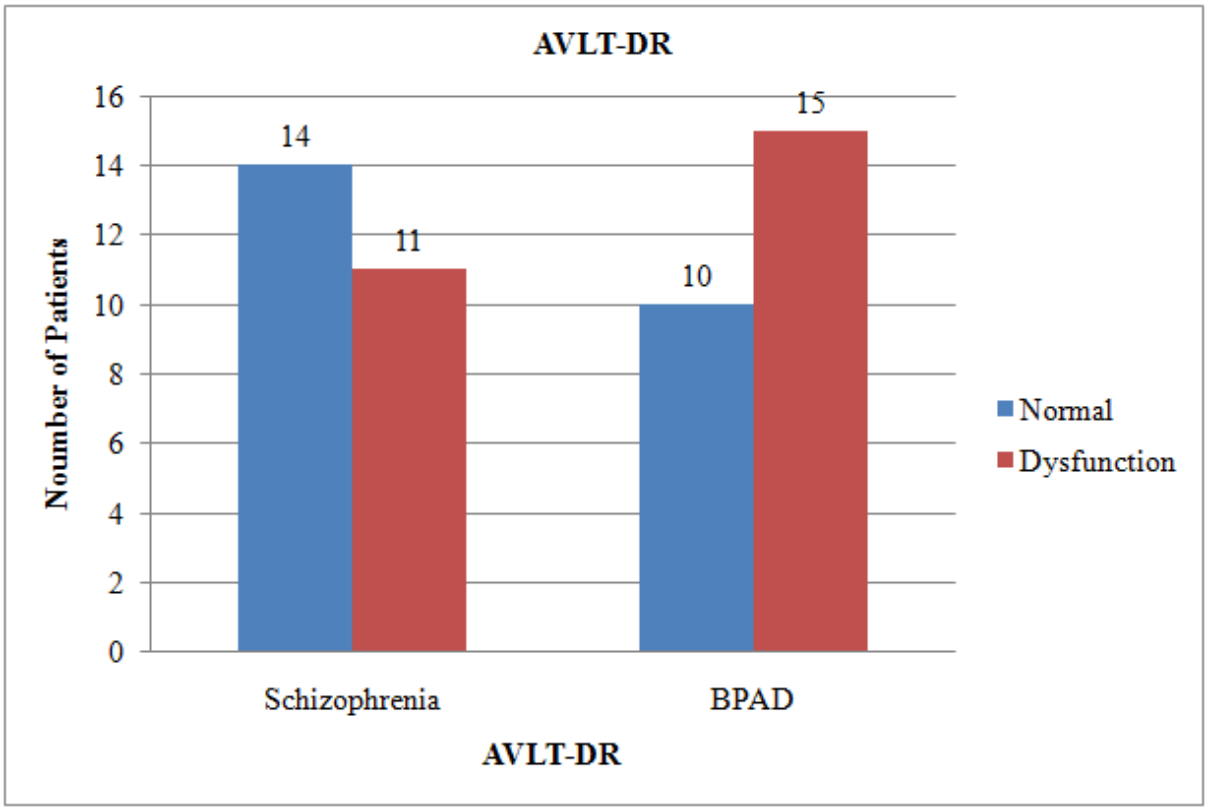
AUDITORY VERBAL LEARNING TEST:

Crosstab			
AVLT- DR			Total
	Schizophrenia	BPAD	
1.00	14	10	24
2.00	11	15	26
Total	25	25	50

The auditory verbal learning test – delayed recall shows dysfunction in 14 (56%) patients in schizophrenia group and 10 (40%) patients in BPAD.

There is no significant difference between the two groups.

The bar diagram shows the number of patients with and without deficits in the two groups:



DIGIT VIGILANCE TEST:

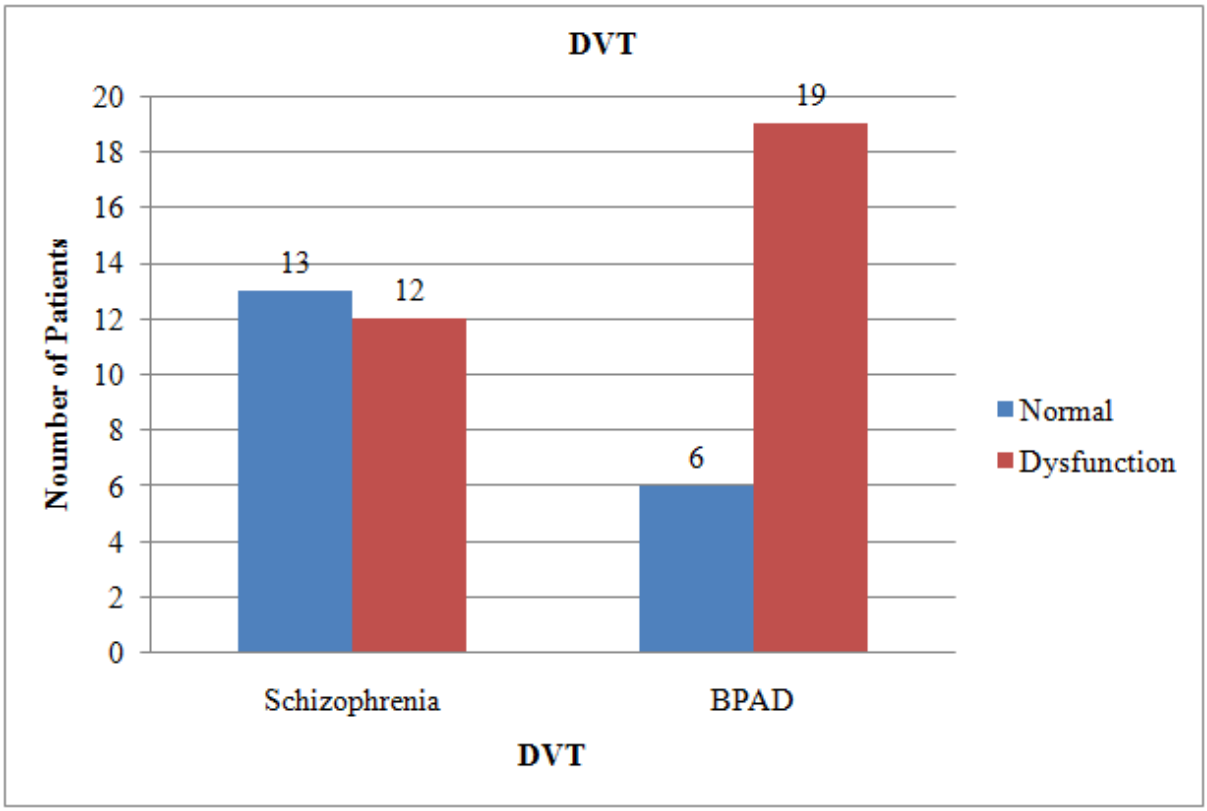
Crosstab			
DVT			Total
	Schizophrenia	BPAD	
1.00	13	6	19
2.00	12	19	31
Total	25	25	50

	t	Df	Significance
Independent t test	-1.102	48	0.276

Digit vigilance test shows dysfunction in 13 (52%) patients in schizophrenia group and 6 (24%) patients in BPAD group.

There is no significant difference between the two groups and the p value is 0.276.

The bar diagram shows the number of patients with and without deficits in the two groups:



DIGIT SYMBOL SUBSTITUTION TEST:

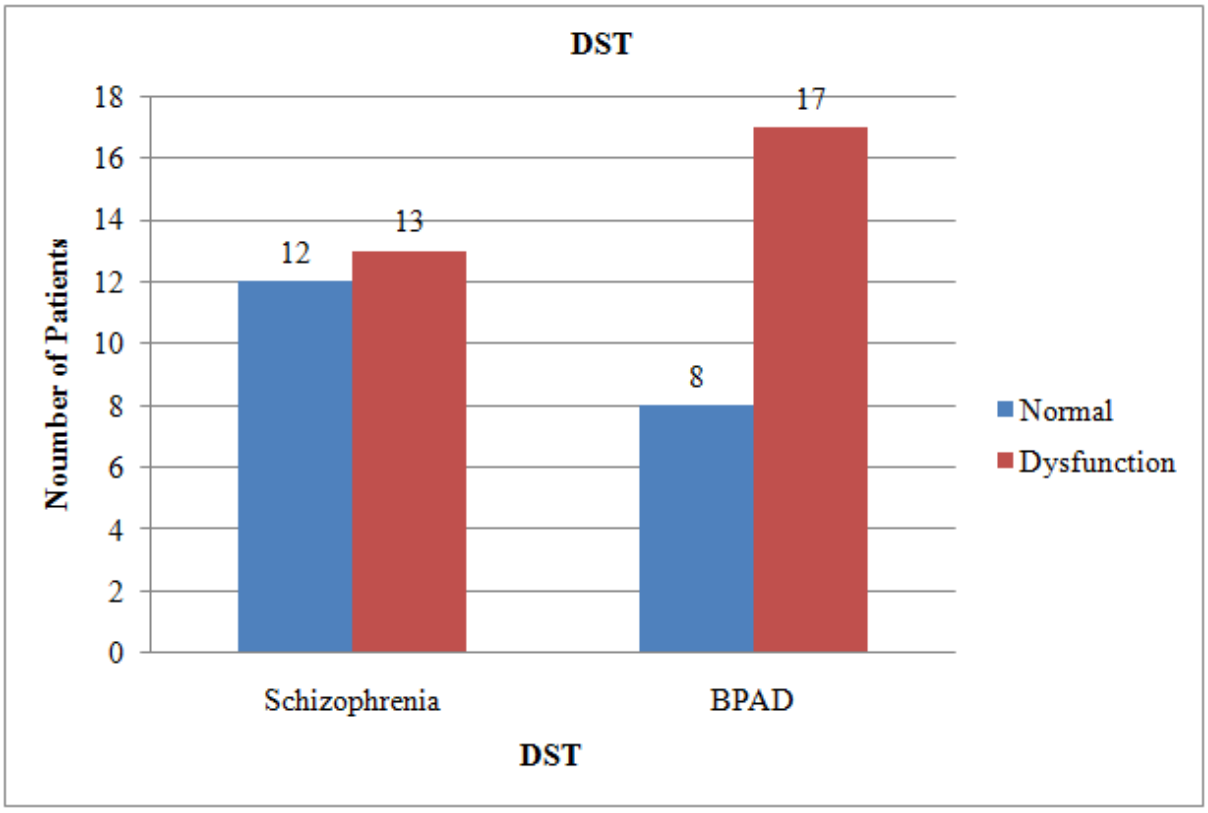
Crosstab			
DST			Total
	Schizophrenia	BPAD	
1.00	12	8	20
2.00	13	17	30
Total	25	25	50

	t	Df	Significance
Independent t test	-1.386	48	0.172

Digit symbol substitution test shows dysfunction in 12 (48%) patients with schizophrenia and 8 (32%) patients with BPAD.

There is no statistical significance between the two groups. The p value is 0.172.

The bar diagram shows the number of patients with and without deficits in the two groups:



ANIMAL NAMING TEST:

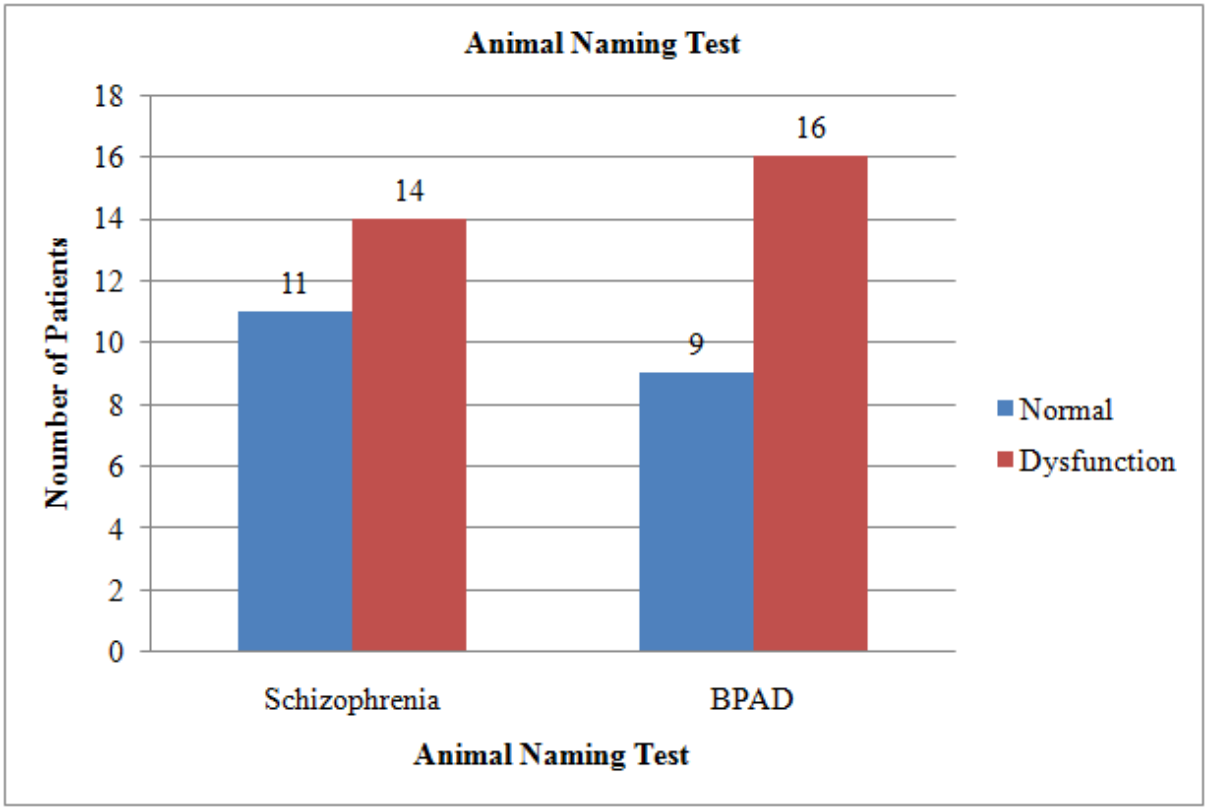
Crosstab			
ANIMAL NAMING TEST			Total
	Schizophrenia	BPAD	
1.00	11	9	20
2.00	14	16	30
Total	25	25	50

	t	Df	Significance
Independent t test	-0.344	48	0.732

In animal naming test 11 (44%) patients from schizophrenia group and 9 (36%) patients from BPAD group had deficits.

There is no significant difference between the two groups in animal naming test. The p value is 0.732 which is >0.005.

The bar diagram shows the number of patients with and without deficits in the two groups:



COWA TEST:

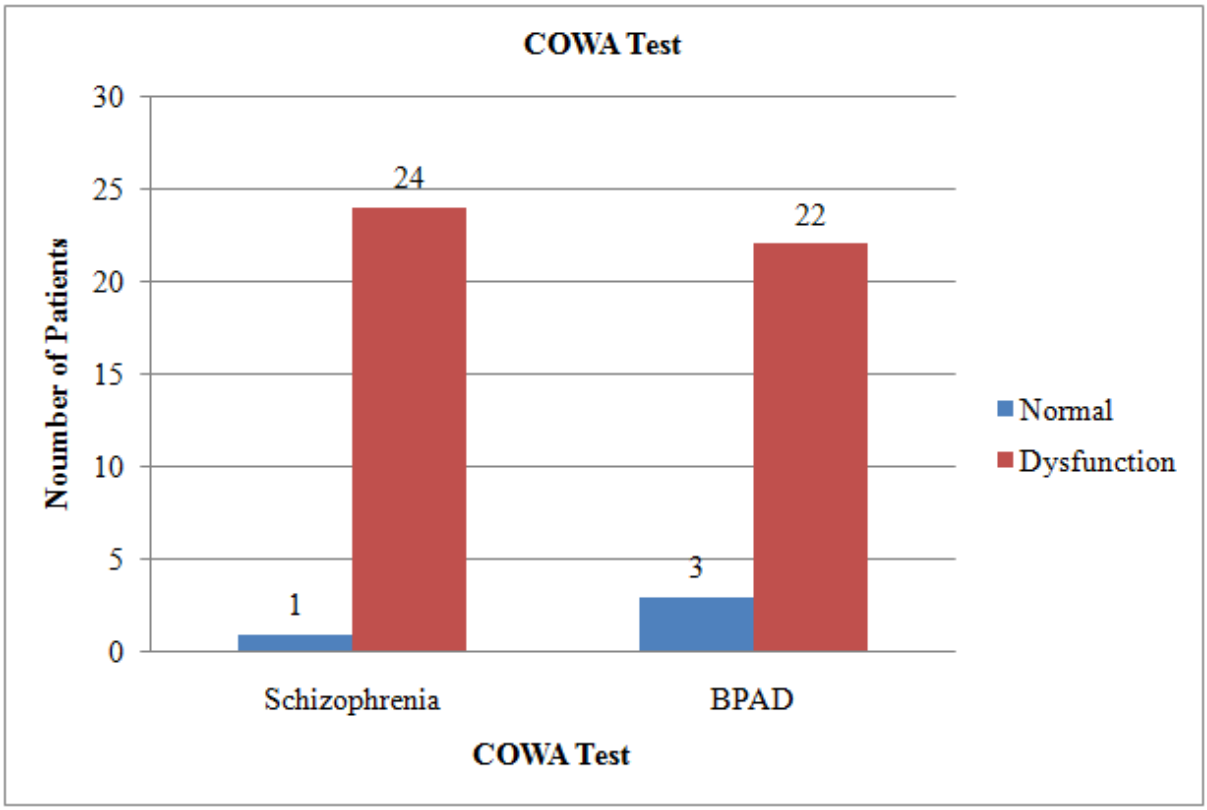
Crosstab			
COWA			Total
	Schizophrenia	BPAD	
1.00	1	3	4
2.00	24	22	26
Total	25	25	50

	t	Df	Significance
Independent t test	-0.878	48	0.384

In COWA test only one patient (4%) in schizophrenia group and three patients (12%) in BPAD group are affected.

There is no significant difference between the two groups. The p value is 0.384.

The bar diagram shows the number of patients with and without deficits in the two groups:



1 BACK TEST:

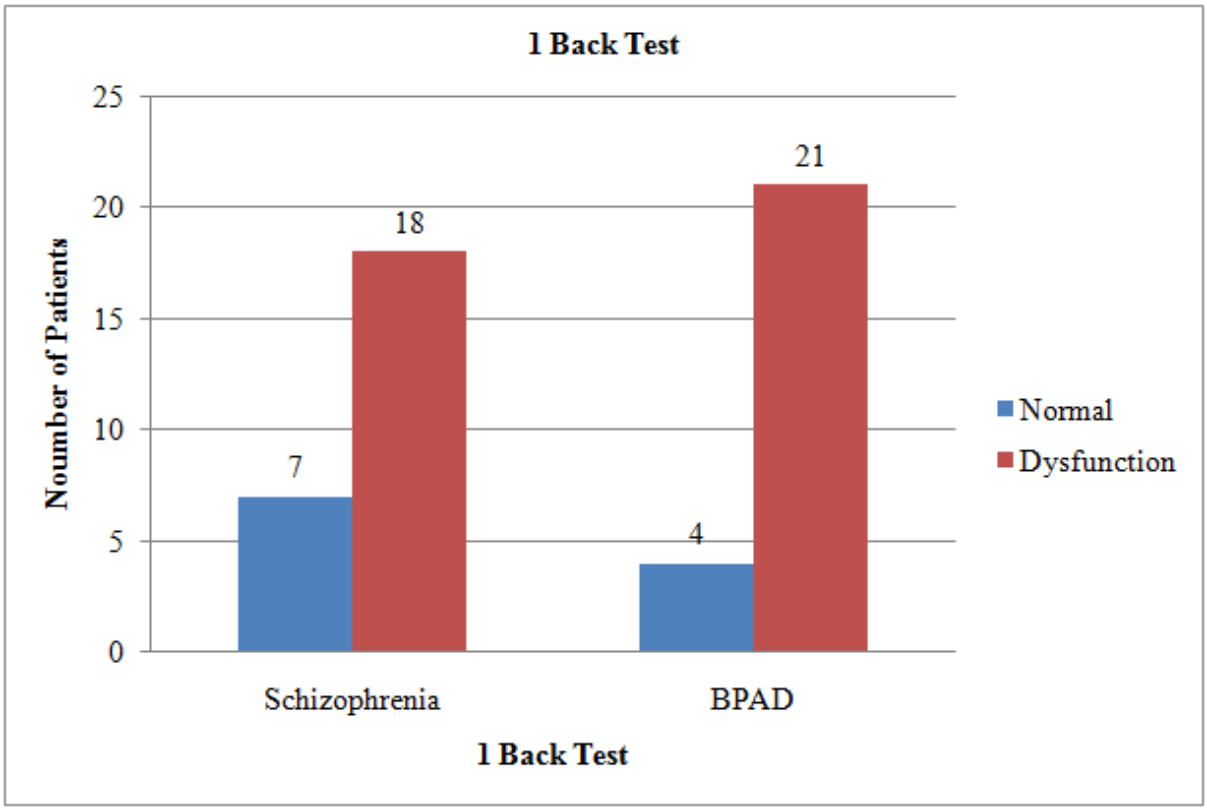
Crosstab			
1 BACK			
	Schizophrenia	BPAD	Total
1.00	7	4	11
2.00	18	21	39
Total	25	25	50

	t	Df	Significance
Independent t test	0.275	48	0.785

The 1 Back-test shows deficits in 7 (28%) patients in schizophrenia group and 4 (16%) patients in BPAD group.

There is no statistical significance between the two groups. The p value is 0.785.

The bar diagram shows the number of patients with and without deficits in the two groups:



2 BACK - TEST:

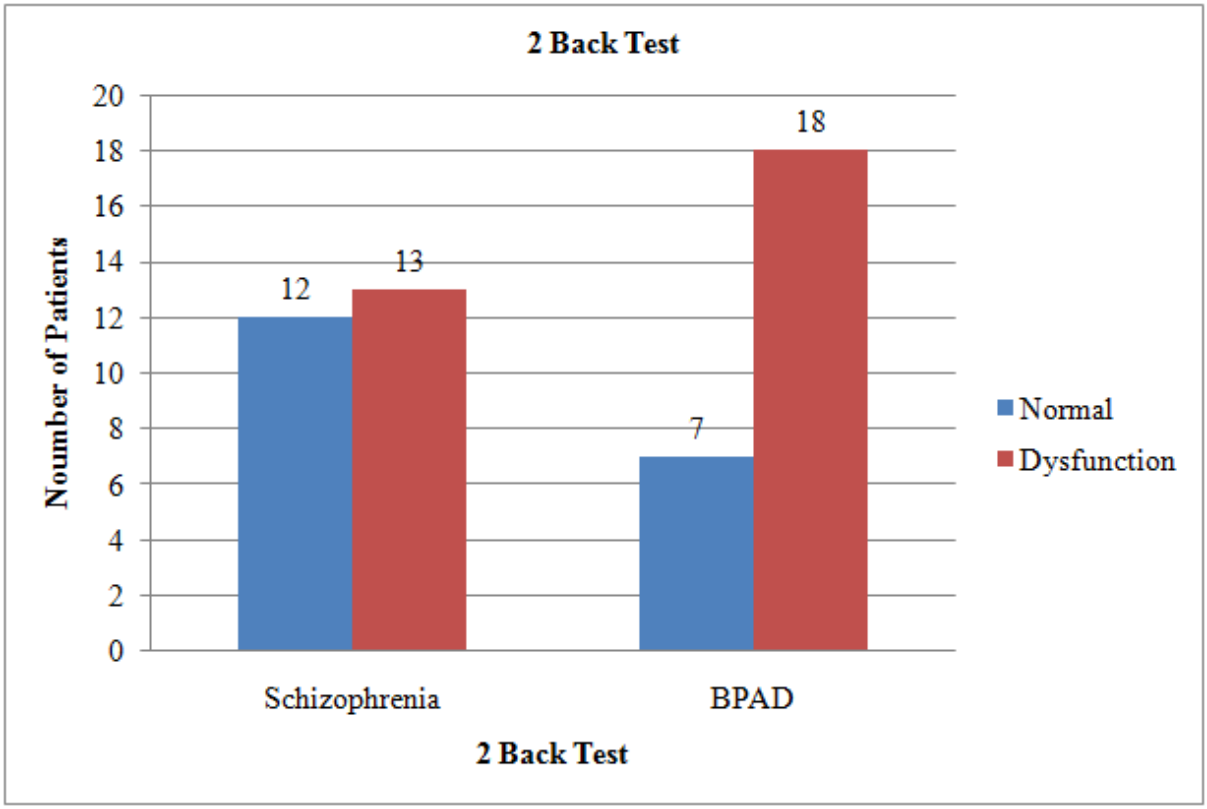
Crosstab			
2 BACK			
	Schizophrenia	BPAD	Total
1.00	12	7	19
2.00	13	18	31
Total	25	25	50

	t	df	Significance
Independent t test	-0.312	48	0.756

The 2 Back - test shows deficits in 12 (48%) patients in schizophrenia group and 7 (28%) patients in BPAD group.

There is no statistical significance between the two groups. The p value is 0.756.

The bar diagram shows the number of patients with and without deficits in the two groups:



COMPLEX FIGURE TEST – COPY:

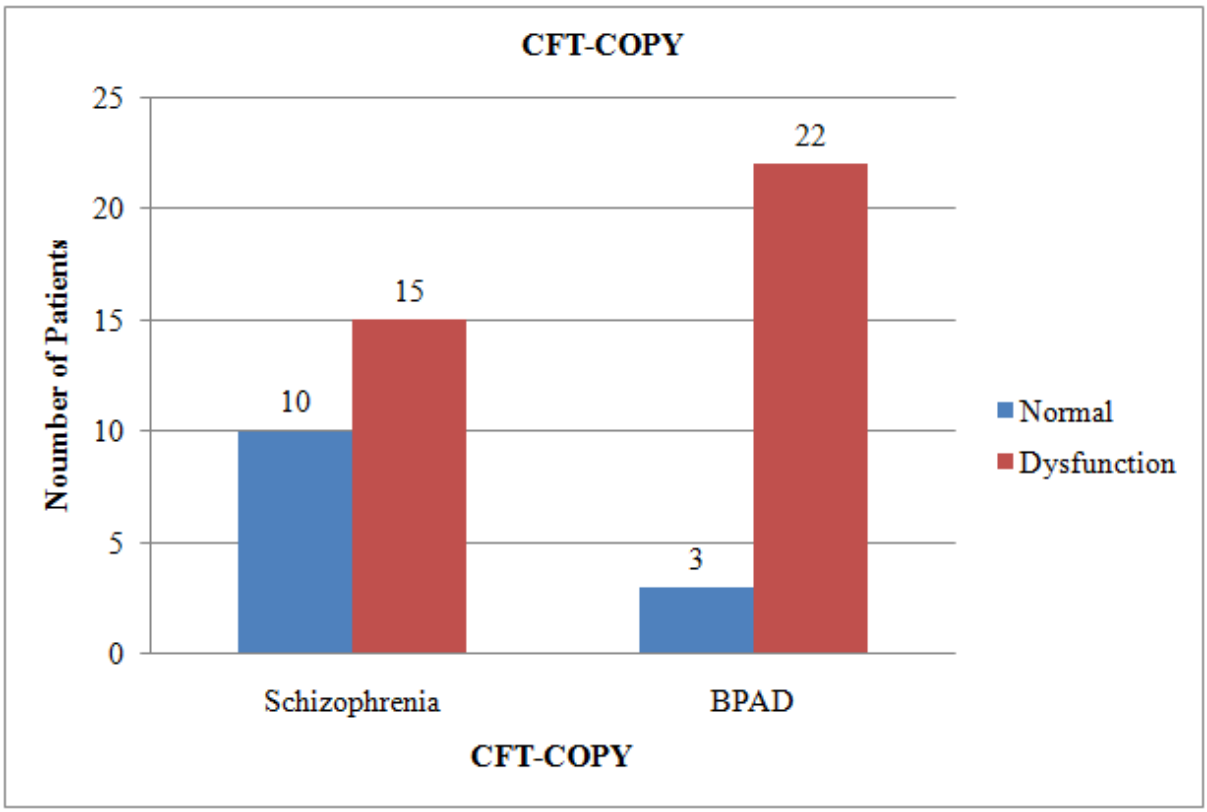
Crosstab			
CFT-COPY			Total
	Schizophrenia	BPAD	
1.00	10	3	13
2.00	15	22	37
Total	25	25	50

	t	Df	Significance
Independent t test	-1.287	48	0.204

The complex figure test – copy, shows deficits in 10 (40%) patients with schizophrenia and 3 (12%) patients with BPAD.

There is no statistical significance between the two groups. The p value is 0.204.

The bar diagram shows the number of patients with and without deficits in the two groups:



COMPLEX FIGURE TEST – IMMEDIATE RECALL:

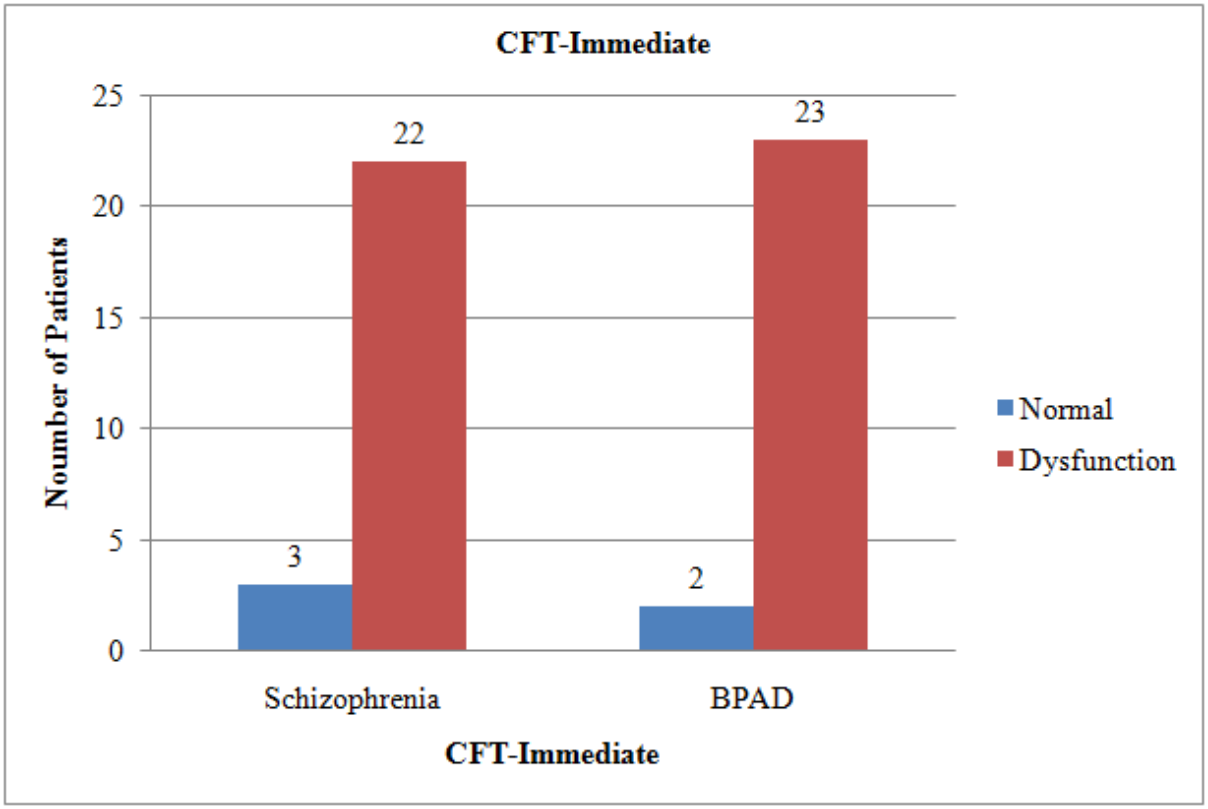
Crosstab			
CFT IMMEDIATE			
	Schizophrenia	BPAD	Total
1.00	22	23	45
2.00	3	2	5
Total	25	25	50

	t	Df	Significance
Independent t test	0.462	48	0.646

The complex figure test – immediate recall, shows deficits in 22 (88%) patients with schizophrenia and 23 (92%) patients with BPAD.

There is no statistical difference between the two groups. The p value is 0.646.

The bar diagram shows the number of patients with and without deficits in the two groups:



COMPLEX FIGURE TEST – DELAYED RECALL:

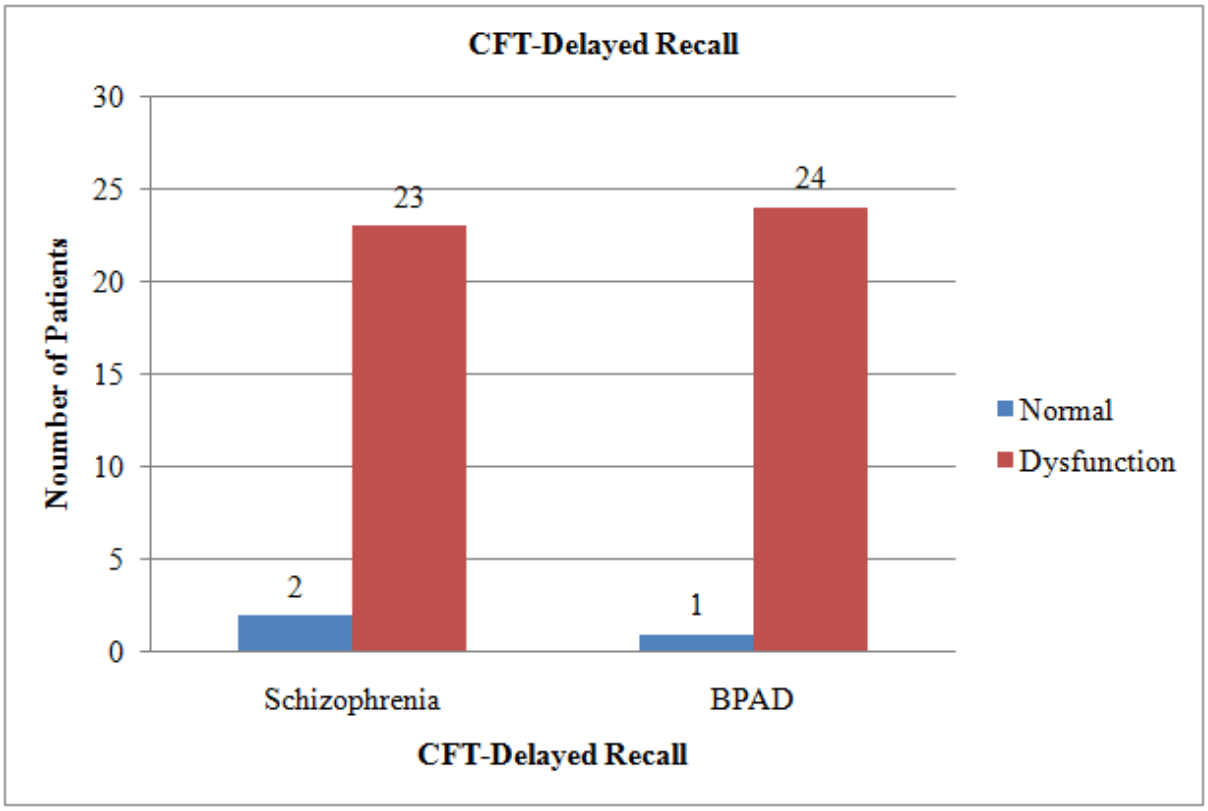
Crosstab			
CFT DELAYED			Total
	Schizophrenia	BPAD	
1.00	23	24	47
2.00	2	1	3
Total	25	25	50

	t	Df	Significance
Independent t test	0.917	48	0.364

The complex figure test – delayed recall, shows deficits in 23 (92%) patients with schizophrenia and 24 (96%) patients with BPAD.

There is no statistical significance between the two groups. The p value is 0.364.

The bar diagram shows the number of patients with and without deficits in the two groups:



COMPARATIVE ANALYSIS OF NEUROCOGNITION AND DURATION OF ILLNESS IN SCHIZOPHRENIA:

AUDITORY VERBAL LEARNING TEST:

DELAYED RECALL:

Crosstab				
Schizophrenia		Duration of illness (years)		Total
		less than 5	more than 5	
AVLT-DR	1.00	5	9	14
	2.00	4	7	11
Total		9	16	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.001	1	0.973
N of Valid Cases	25		

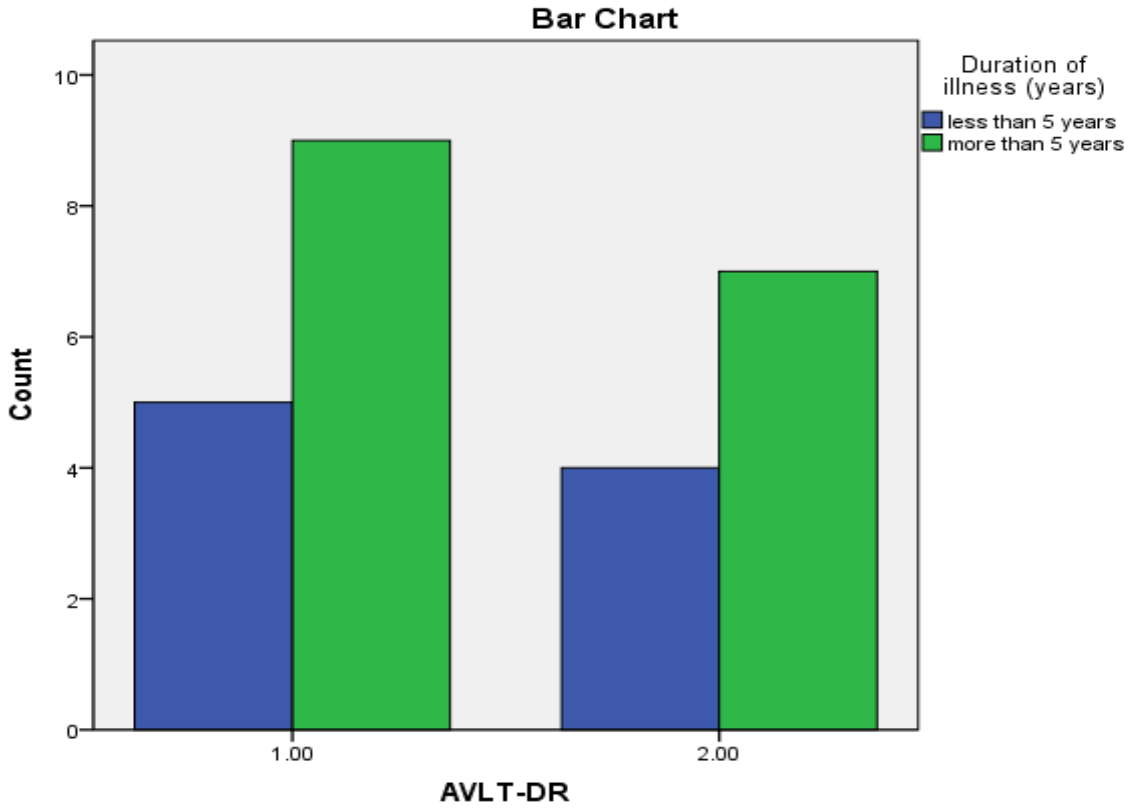
Among schizophrenia patients we did a sub- analysis to compare the neurocognitive functions in patients who suffer the illness for more than five years with those with illness for less than five years.

In auditory verbal learning test - delayed recall, there is no significant difference between the two groups and the p value is 0.973 (>p 0.005)

The bar diagram shows the number of patients with and without deficits in the two groups within schizophrenia patients with duration of illness less than 5 years and more than 5 years:

1.0 Represents patients with deficits.

2.0 Represents patients without deficits



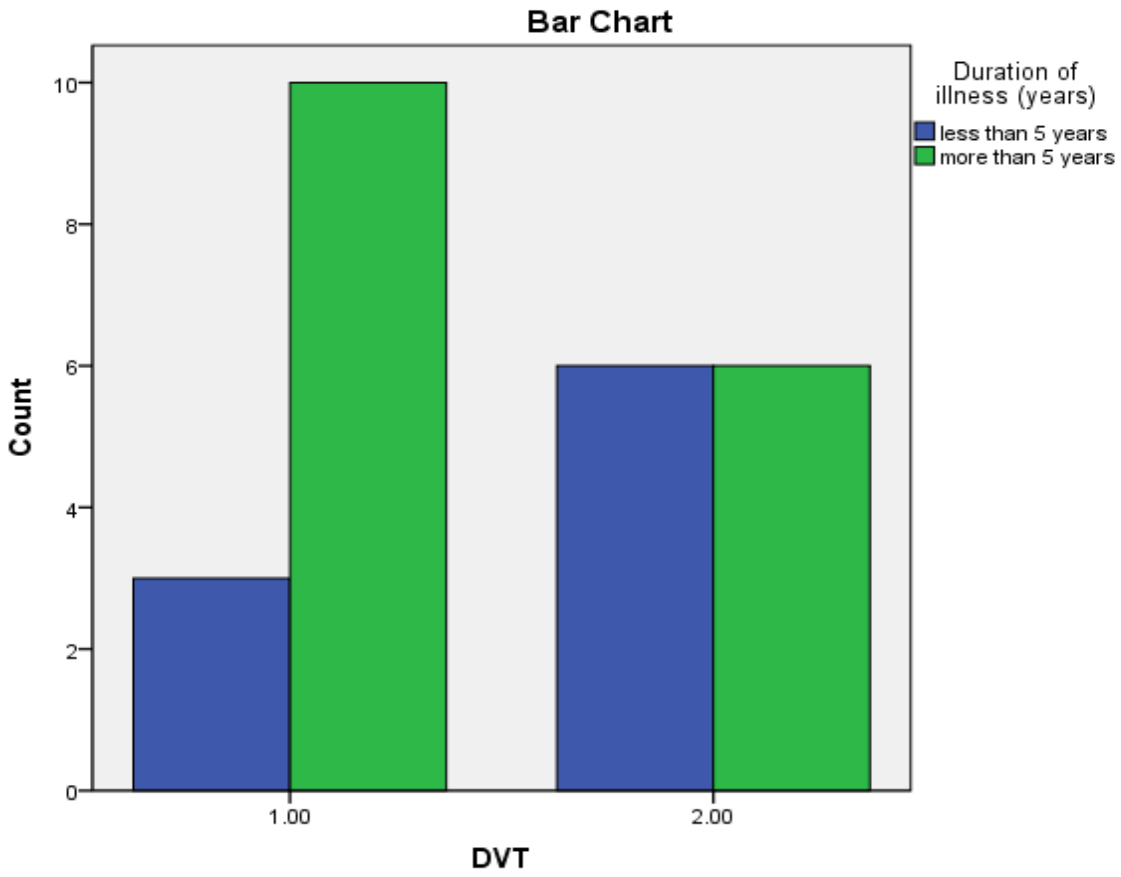
DIGIT VIGILANCE TEST:

Crosstab				
Schizophrenia		Duration of illness (years)		
		less than 5 years	more than 5 years	Total
DVT	1.00	3	10	13
	2.00	6	6	12
Total		9	16	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.963	1	.161
N of Valid Cases	25		

In digit vigilance test 3 patients from less than 5 years illness group and 10 patients from more than 5 years illness group had deficits.

There was no significant difference between the two groups when comparing the digit vigilance test and the p value is 0.161.



The bar diagram shows the number of patients with and without deficits in the two groups within schizophrenia patients with duration of illness less than 5 years and more than 5 years:

1.00 Represents patients with deficits.

2.00 Represents patients without deficits

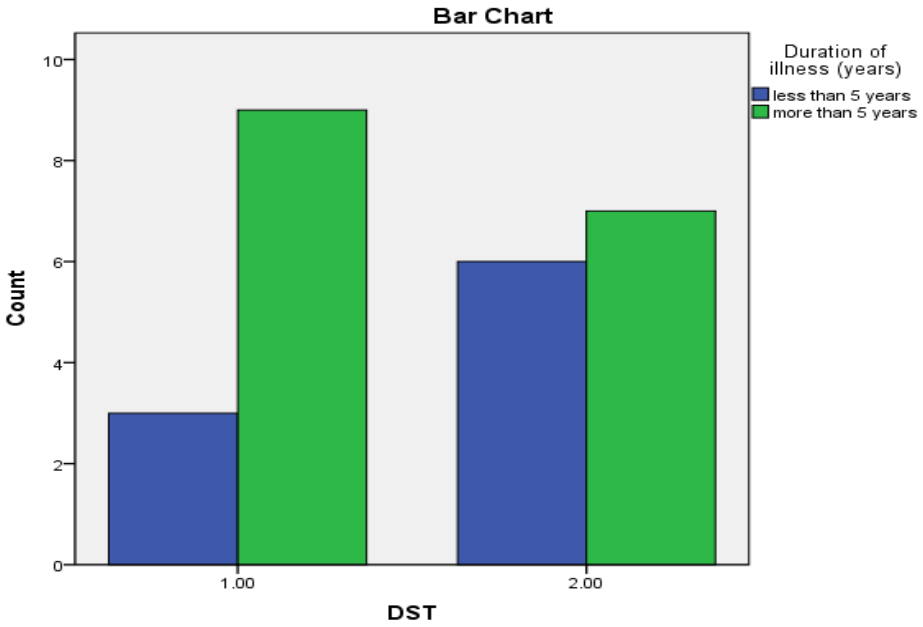
DIGIT SUBSTITUTION TEST:

Crosstab				
Schizophrenia		Duration of illness (years)		
		less than 5 years	more than 5 years	Total
DST	1.00	3	9	12
	2.00	6	7	13
Total		9	16	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.212	1	.271
N of Valid Cases	25		

In digit symbol substitution test 3 patients from less than 5 years illness group and 9 patients from more than 5 years illness group had deficits.

Digit symbol substitution test did not show any significant difference between the above two groups of patients with schizophrenia for more than five years and less than five years. The p value is 0.271 which is >0.005.



The bar diagram shows the number of patients with and without deficits in the two groups within schizophrenia patients with duration of illness less than 5 years and more than 5 years:

1.00represents patients with deficits

2.00Represents patients without deficits

ANIMAL NAMING TEST:

Schizophrenia		Duration of illness (years)		Total
		less than 5 years	more than 5 years	
Animal naming test	1.00	2	9	11
	2.00	7	7	14
Total		9	16	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.707	1	.100
N of Valid Cases	25		

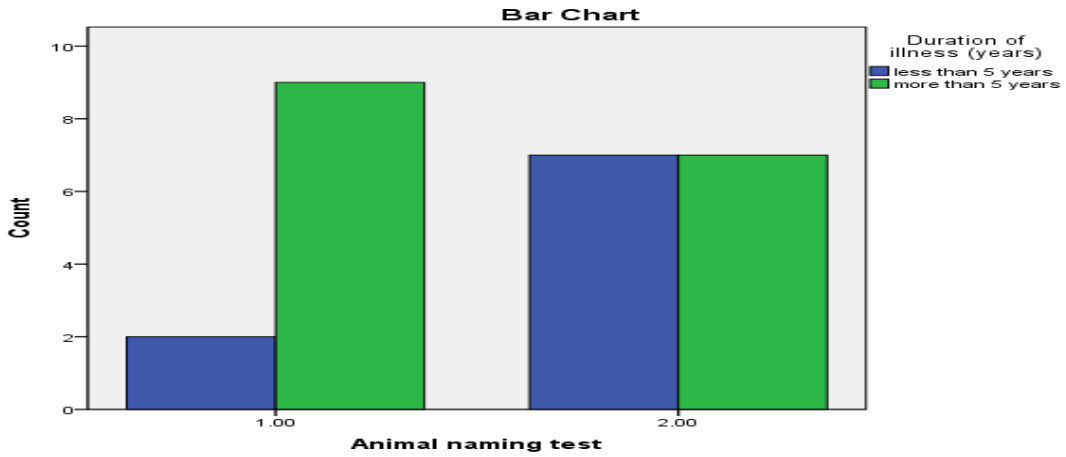
In animal naming test 2 patients from less than 5 years illness group and 9 patients from more than 5 years illness group had deficits.

There is no significant difference between the two groups in animal naming test which elicits executive function.

The bar diagram shows the number of patients with and without deficits in the two groups within schizophrenia patients with duration of illness less than 5 years and more than 5 years:

1.00 Represents patients with deficits.

2.00 Represents patients without deficits



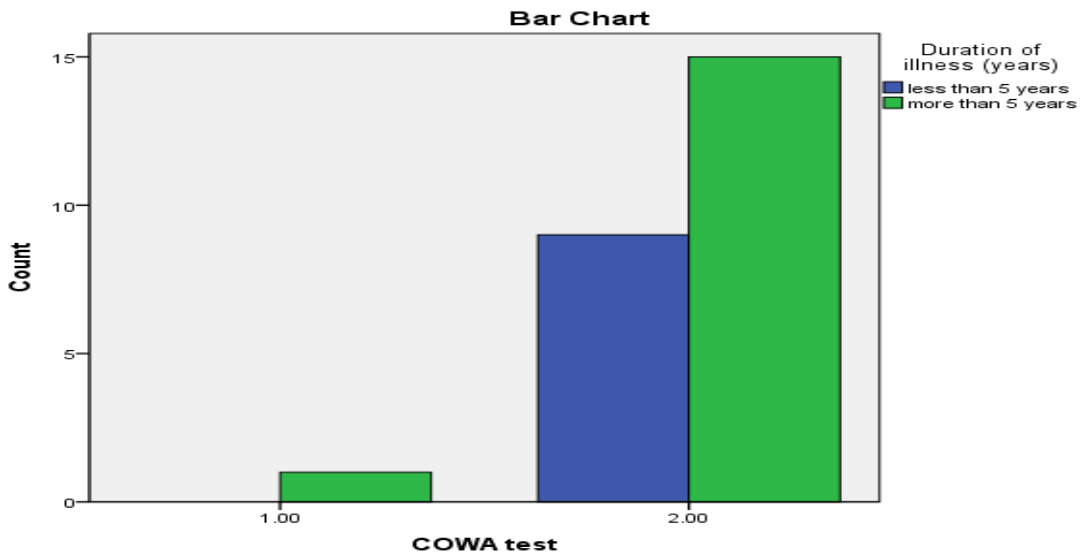
COWA TEST:

Schizophrenia		Duration of illness (years)		Total
		less than 5 years	more than 5 years	
COWA	1.00	0	1	1
	2.00	9	15	24
Total		9	16	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.586	1	0.444
N of Valid Cases	25		

In COWA test none of the patients from less than 5 years illness group and 1 patient from more than 5 years illness group had deficits.

Controlled oral word association test did not show any significant difference between the two groups with p value of 0.444.



The bar diagram shows the number of patients with and without deficits in the two groups within schizophrenia patients with duration of illness less than 5 years and more than 5 years:

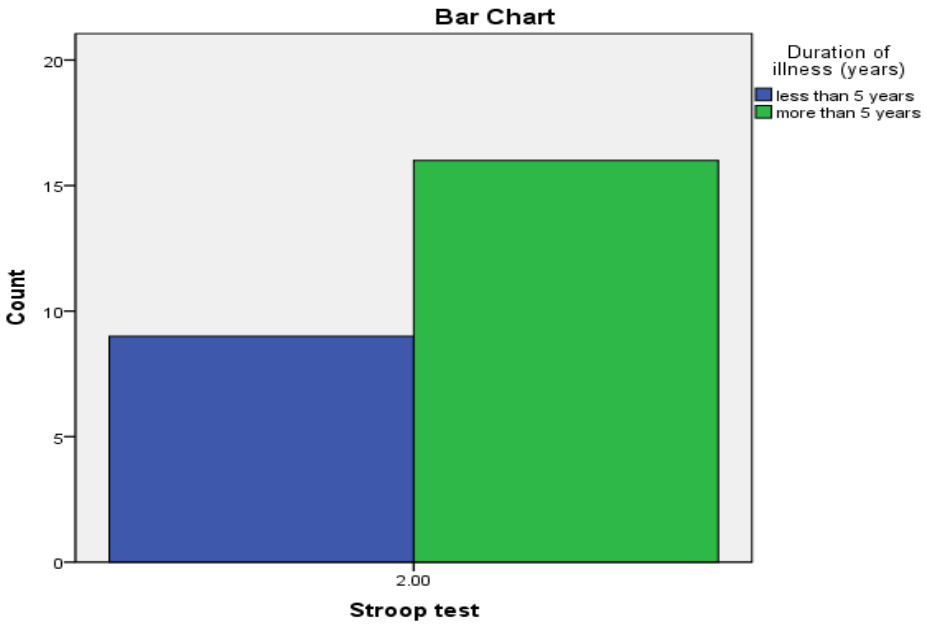
1.00 Represents patients with deficits.

2.00 Represents patients without deficits

STROOP TEST:

Schizophrenia		Duration of illness (years)		Total
		less than 5 years	more than 5 years	
Stroop test	2.00	9	16	25
Total		9	16	25

In stroop test all 25 patients scored above 15th percentile which shows normal functioning.



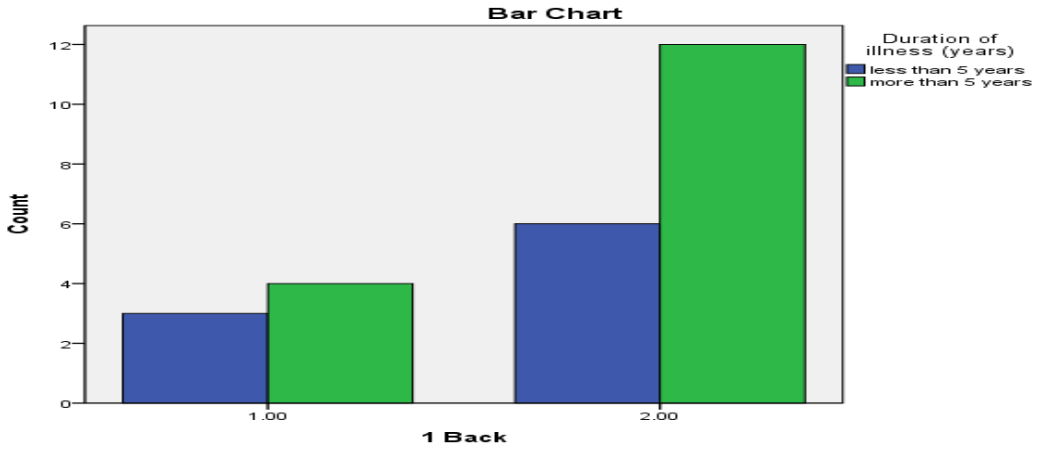
1 Back test:

Schizophrenia		Duration of illness (years)		
		less than 5 years	more than 5 years	Total
1 Back	1.00	3	4	7
	2.00	6	12	18
Total		9	16	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.198	1	0.656
N of Valid Cases	25		

In 1- BACK test 3 patients from less than 5 years illness group and 4 patients from more than 5 years illness group had deficits.

1 Back test did not show any significance between the two groups. The p value is 0.656.



The bar diagram shows the number of patients with and without deficits in the two groups within schizophrenia patients with duration of illness less than 5 years and more than 5 years:

1.00 represents patients with deficits.

2.00 Represents patients without deficits

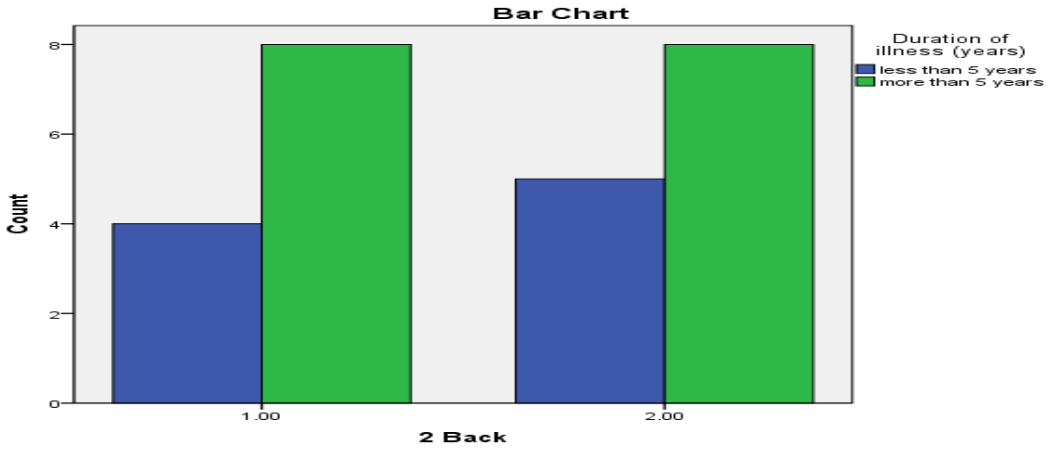
2- Back test:

Schizophrenia		Duration of illness (years)		
		less than 5 years	more than 5 years	Total
2 Back	1.00	4	8	12
	2.00	5	8	13
Total		9	16	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.071	1	.790
N of Valid Cases	25		

In 2 BACK test 4 patients from less than 5 years illness group and 8 patients from more than 5 years illness group had deficits.

2 Back test did not show any significance between the two groups. The p value is 0.790.



The bar diagram shows the number of patients with and without deficits in the two groups within schizophrenia patients with duration of illness less than 5 years and more than 5 years:

1.00 Represents patients with deficits.

2.00 Represents patients without deficits

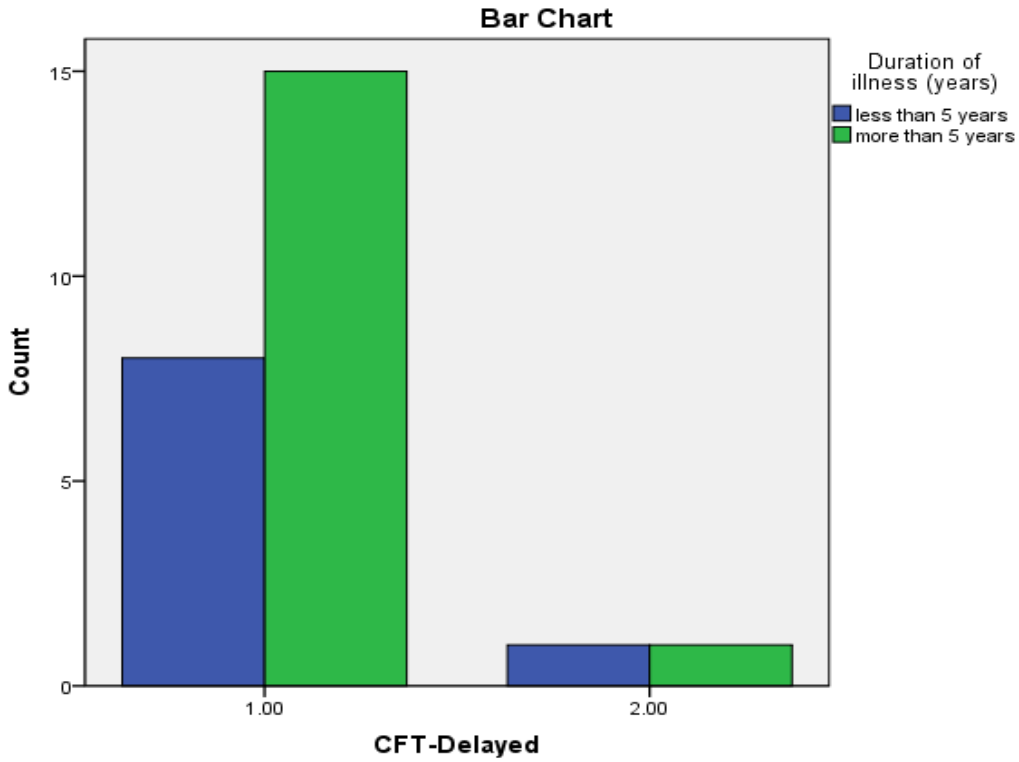
CFT DELAYED:

Schizophrenia		Duration of illness (years)		Total
		less than 5 years	more than 5 years	
CFT delayed	1.00	8	15	23
	2.00	1	1	2
Total		9	16	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.185	1	.667
N of Valid Cases	25		

In CFT delayed recall test 8 patients from less than 5 years illness group and 15 patients from more than 5 years illness group had deficits.

Complex figure test- delayed recall did not show any significant difference between the two groups with the p value of 0.667.



The bar diagram shows the number of patients with and without deficits in the two groups within schizophrenia patients with duration of illness less than 5 years and more than 5 years:

1.00 Represents patients with deficits.

2.00 Represents patients without deficits

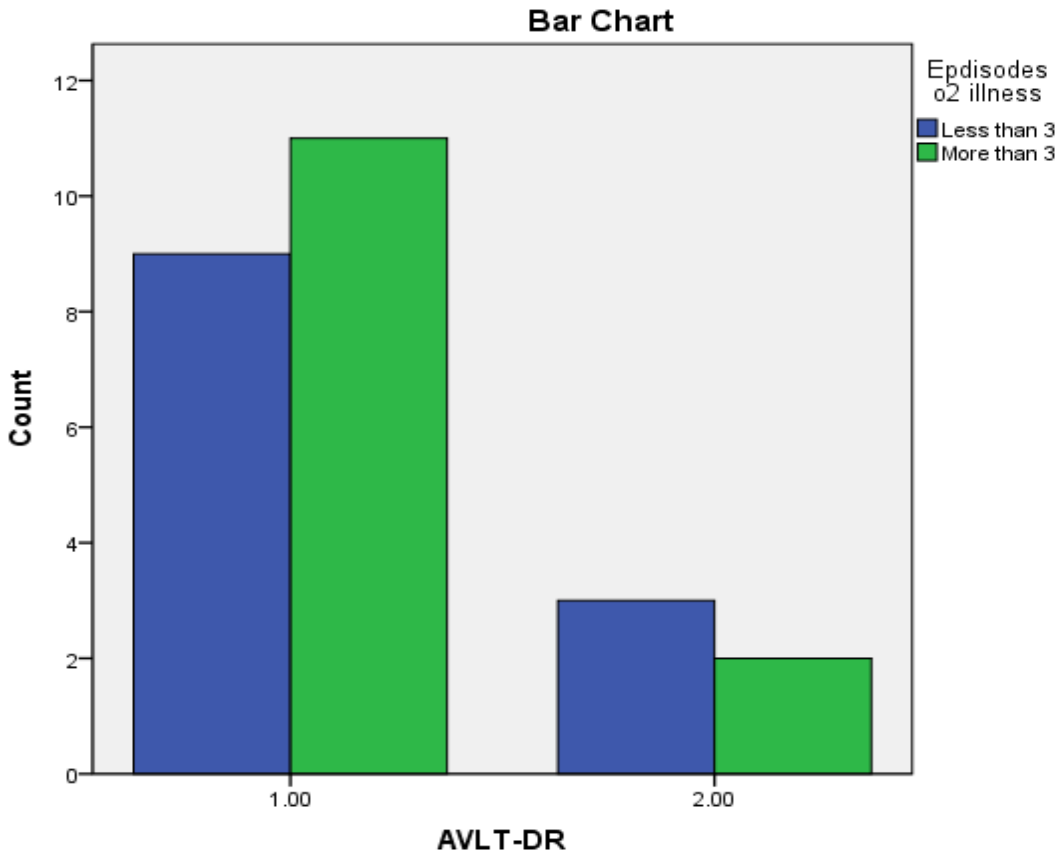
COMPARATIVE ANALYSIS OF NEUROCOGNITION AND NUMBER OF AFFECTIVE EPISODES IN BIPOLAR AFFECTIVE ILLNESS:

AUDITORY VERBAL LEARNING TEST – DELAYED RECALL:

BPAD		Number of affective episodes		
		Less than 3	More than 3	Total
AVLT-DR	1.00	9	11	20
	2.00	3	2	5
Total		12	13	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.361	1	.548
N of Valid Cases	25		

Among 25 patients in BPAD group, 20 patients had deficit in auditory verbal learning test. In these 20 patients 9 of them had less than three affective episodes in the past while 11 of them had more than three episodes of illness. There is no significance between the two groups and the p value is 0.548.



The bar diagram shows the number of patients with and without deficits in the two groups within bipolar affective disorder patients with number of episodes of illness: less than 3 and more than 3.

1.0 Represents patients with deficits.

2.0 Represents patients without deficits

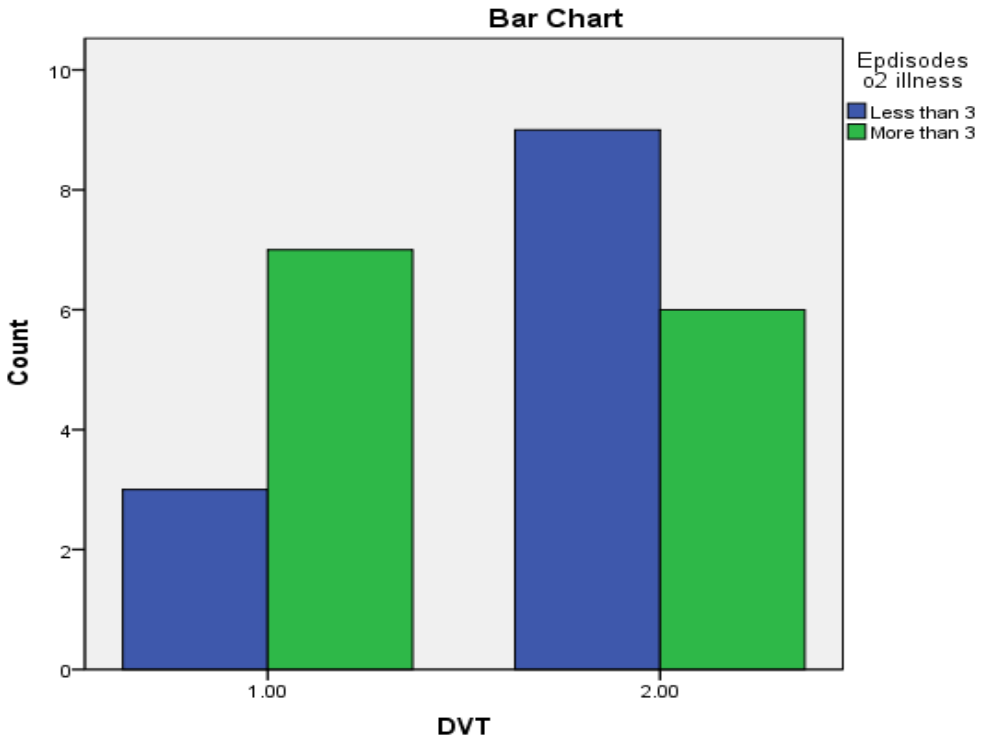
DIGIT VIGILANCE TEST:

BPAD		Number of affective episodes		
		Less than 3	More than 3	Total
DVT	1.00	3	7	10
	2.00	9	6	15
Total		12	13	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.163	1	.141
N of Valid Cases	25		

In digit vigilance test 3 patients with less than three episodes of illness and 7 patients with more than three episodes of illness had deficits.

Digit vigilance test did not show any significant difference between the two groups and the p value is 0.141.



The bar diagram shows the number of patients with and without deficits in the two groups within bipolar affective disorder patients with number of episodes of illness: less than 3 and more than 3.

1.00 Represents patients with deficits.

2.00 Represents patients without deficits

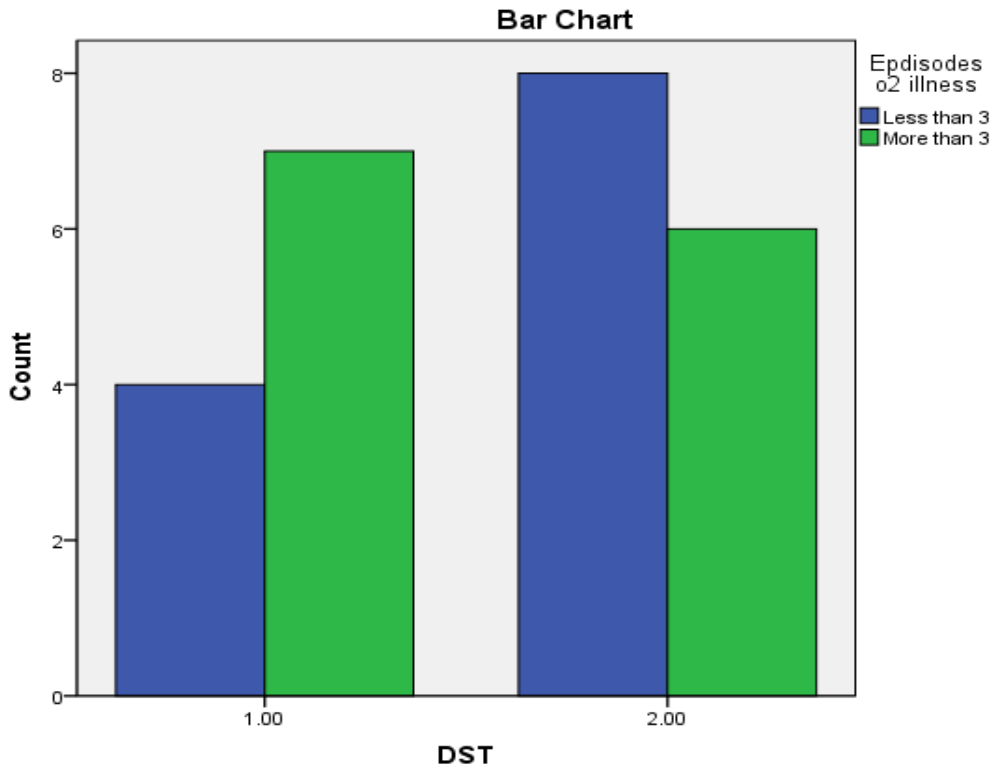
DIGIT SYMBOL SUBSTITUTION TEST:

BPAD		Number of affective episodes		
		Less than 3	More than 3	Total
DST	1.00	4	7	11
	2.00	8	6	14
Total		12	13	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.066	1	.302
N of Valid Cases	25		

In digit symbol substitution test 4 patients with less than three episodes of illness and 7 patients with more than three episodes of illness had deficits.

Digit symbol substitution test did not show any significance between the two groups and the p value is 0.302.



The bar diagram shows the number of patients with and without deficits in the two groups within bipolar affective disorder patients with number of episodes of illness: less than 3 and more than 3.

1.00 Represents patients with deficits.

2.00 Represents patients without deficits

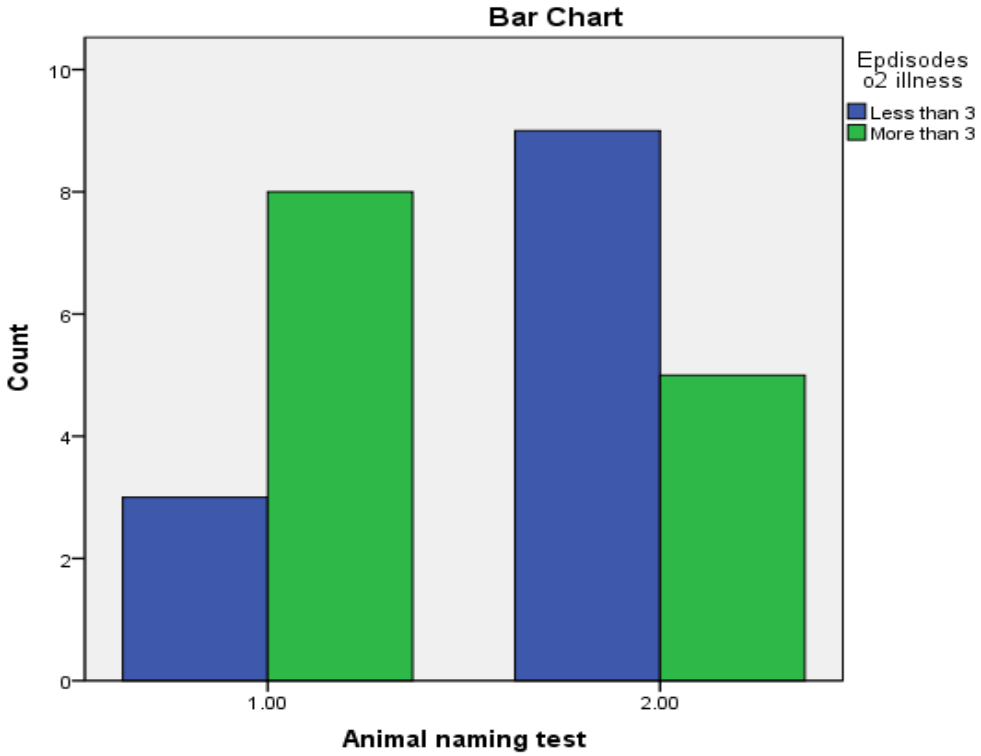
ANIMAL NAMING TEST:

BPAD		Number of affective episodes		
		Less than 3	More than 3	Total
Animal naming test	1.00	3	8	11
	2.00	9	5	14
Total		12	13	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.381	1	.066
N of Valid Cases	25		

In animal naming test 3 patients with less than three episodes of illness and 8 patients with more than three episodes of illness had deficits.

Animal naming test did not show any significant difference between the two groups and the p value is 0.066.



The bar diagram shows the number of patients with and without deficits in the two groups within bipolar affective disorder patients with number of episodes of illness: less than 3 and more than 3.

1.00 Represents patients with deficits.

2.00 Represents patients without deficits

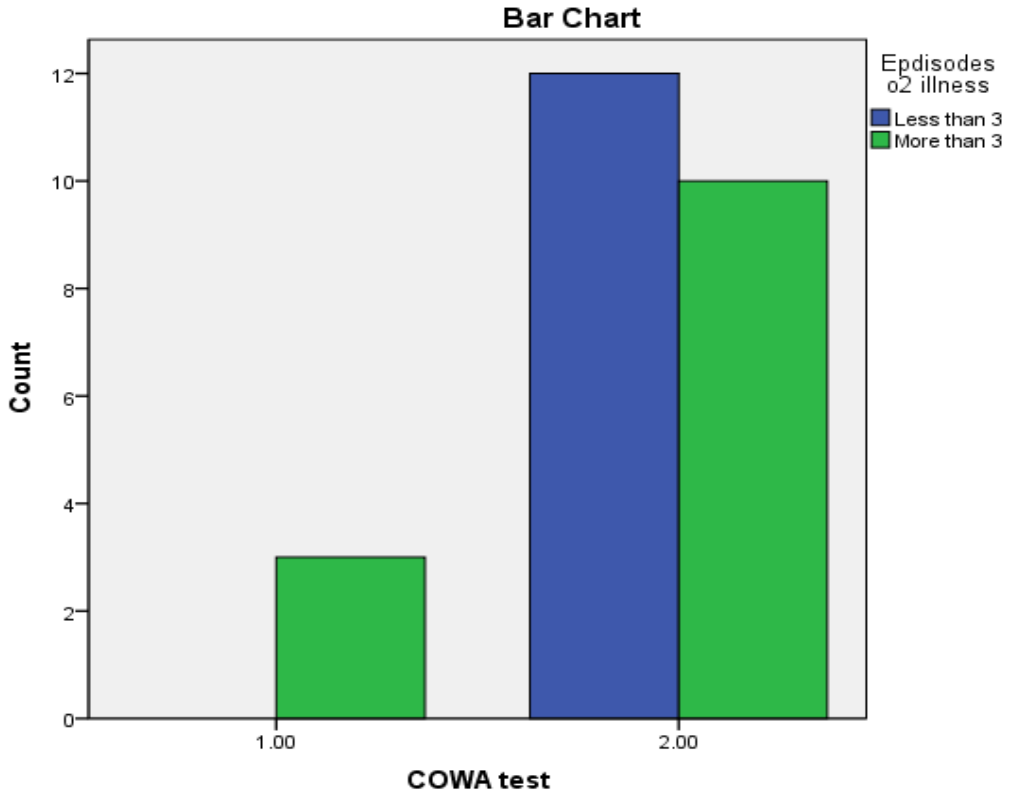
COWA TEST:

BPAD		Number of affective episodes		
		Less than 3	More than 3	Total
COWA test	1.00	0	3	3
	2.00	12	10	22
Total		12	13	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.147[a]	1	.076
N of Valid Cases	25		

In COWA test none of the patients with less than three episodes of illness and 3 patients with more than three episodes of illness had deficits.

There is no significant difference between the two groups who were assessed with COWA test.



The bar diagram shows the number of patients with and without deficits in the two groups within bipolar affective disorder patients with number of episodes of illness: less than 3 and more than 3.

1.00 Represents patients with deficits.

2.00 Represents patients without deficits

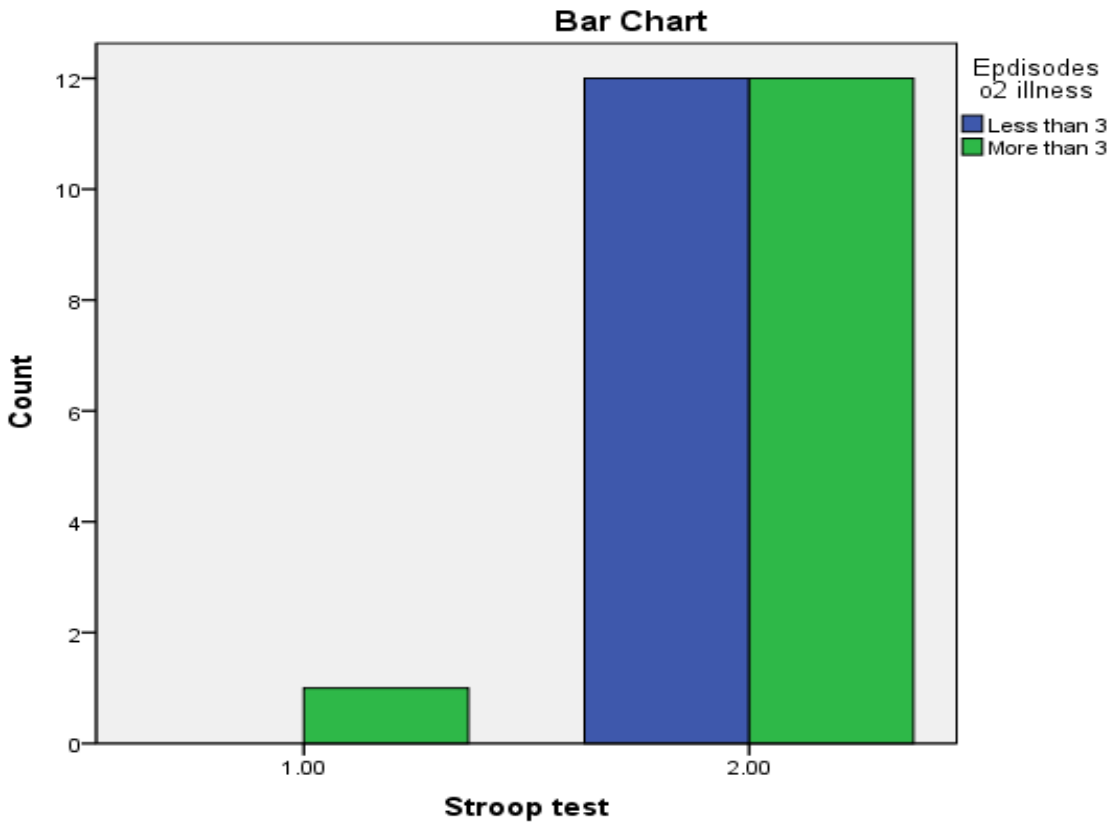
STROOP TEST:

BPAD		Number of affective episodes		
		Less than 3	More than 3	Total
Stroop test	1.00	0	1	1
	2.00	12	12	24
Total		12	13	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.962	1	.327
N of Valid Cases	25		

In stroop test none of the patients with less than three episodes of illness and one patient with more than three episodes of illness had deficits.

The stroop test did not show any significant difference between the two groups. The p value is 0.327.


Bar Chart
Epdisodes o2 illness
Less than 3
More than 3
Count
0
2
4
6
8
10
12
1.00
2.00
Stroop test

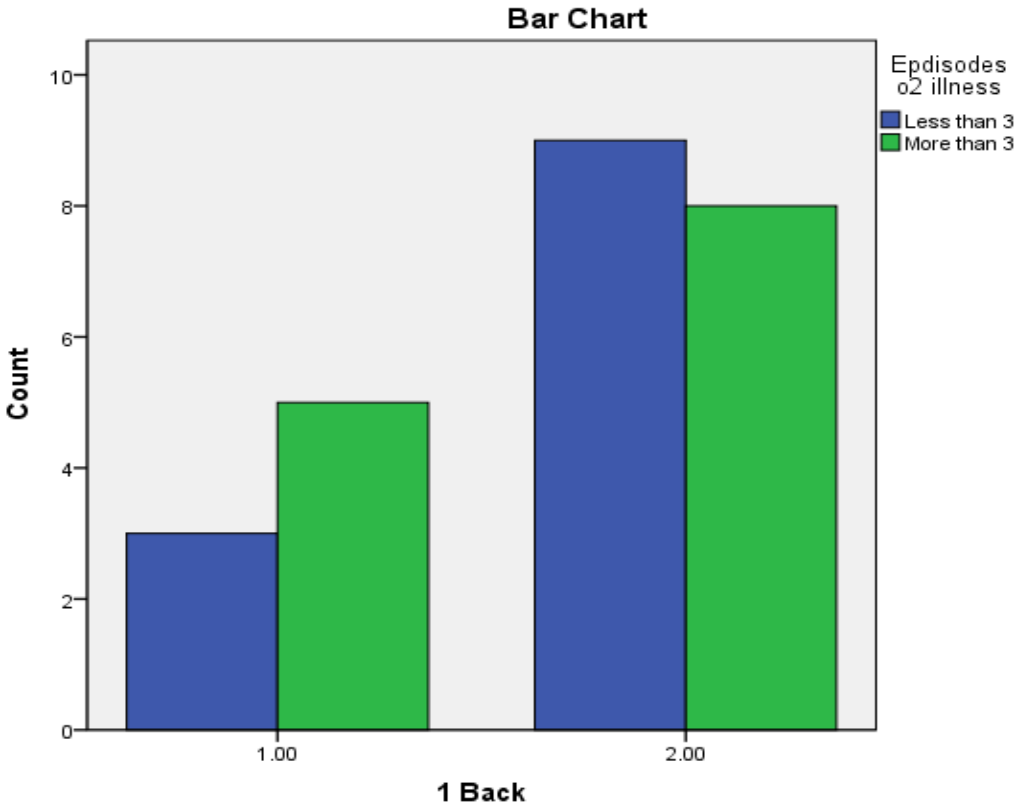
1 BACK TEST:

BPAD		Number of affective episodes		Total
		Less than 3	More than 3	
1 Back	1.00	3	5	8
	2.00	9	8	17
Total		12	13	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.520	1	.471
N of Valid Cases	25		

In 1 BACK - test 3 patients with less than three episodes of illness and 5 patients with more than three episodes of illness had deficits.

There is no significant difference between the two groups is noted in 1 back test. The p value is 0.471.



The bar diagram shows the number of patients with and without deficits in the two groups within bipolar affective disorder patients with number of episodes of illness: less than 3 and more than 3.

1.00 Represents patients with deficits.

2.00 Represents patients without deficits

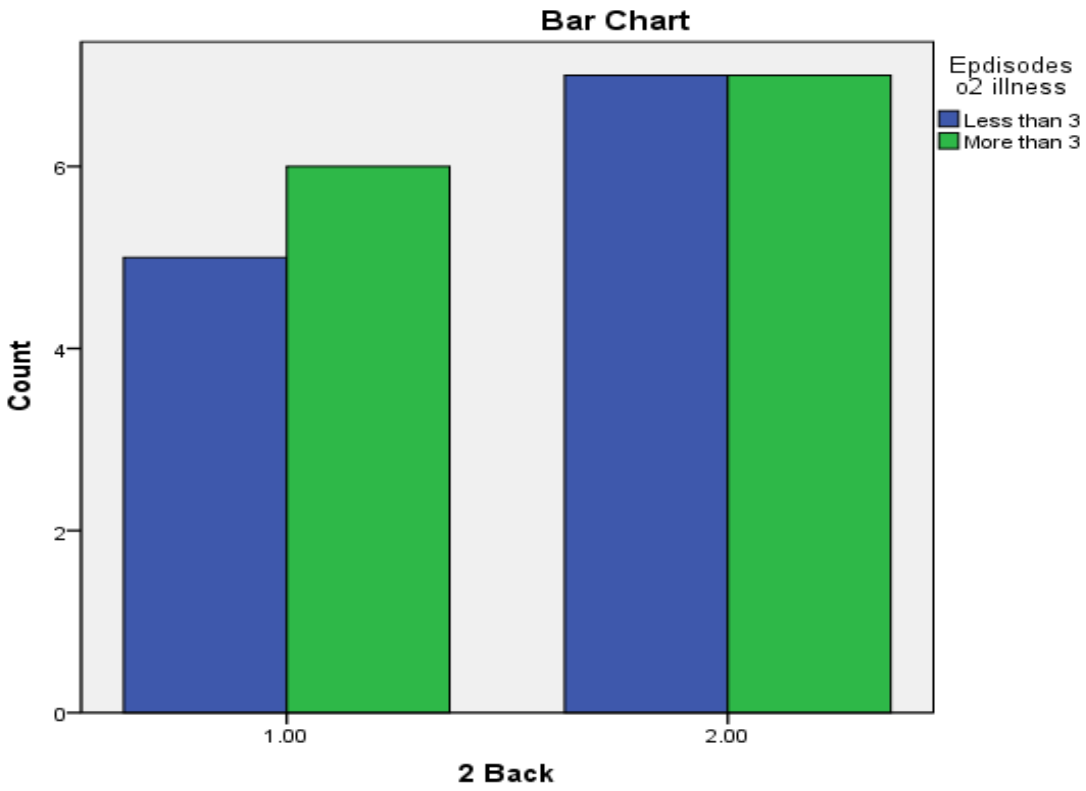
2 BACK - TEST:

BPAD		Number of affective episodes		Total
		Less than 3	More than 3	
2 Back	1.00	5	6	11
	2.00	7	7	14
Total		12	13	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.051	1	0.821
N of Valid Cases	25		

In 2 - BACK test 5 patients with less than three episodes of illness and 6 patients with more than three episodes of illness had deficits.

There is no significant difference between the two groups is noted in 2 back test. The p value is 0.821.



The bar diagram shows the number of patients with and without deficits in the two groups within bipolar affective disorder patients with number of episodes of illness: less than 3 and more than 3.

1.00 Represents patients with deficits.

2.00 Represents patients without deficits

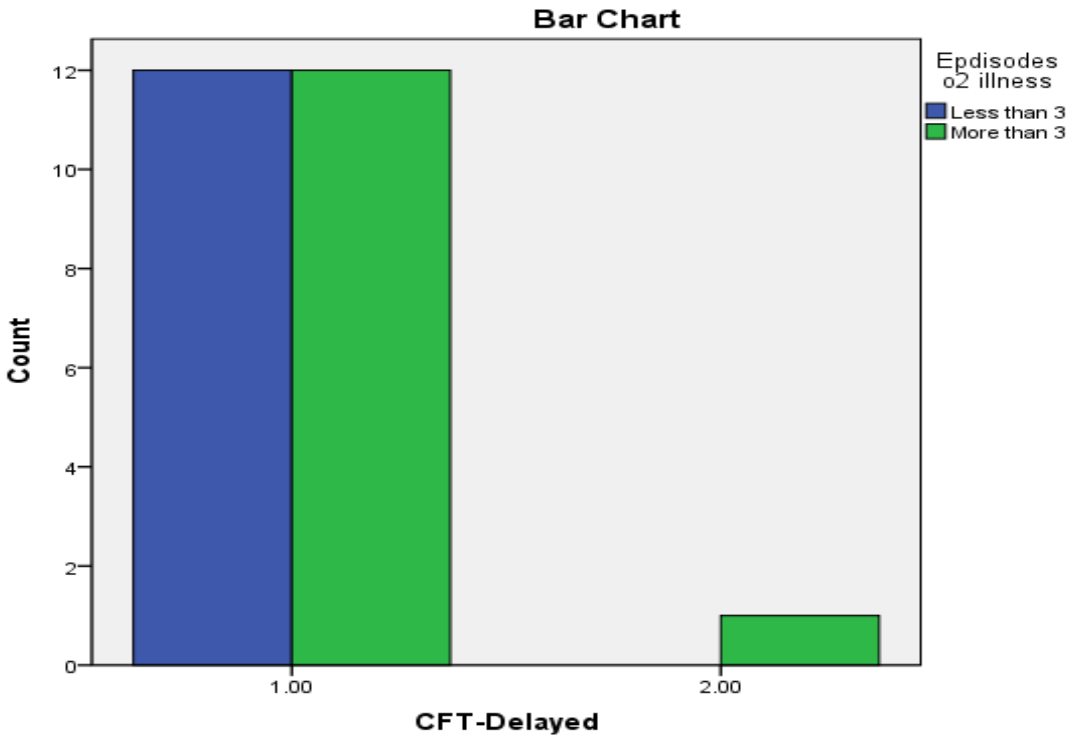
COMPLEX FIGURE TEST – DELAYED RECALL:

Crosstab				
BPAD		Number of affective episodes		
		Less than 3	More than 3	Total
CFT-Delayed	1.00	12	12	24
	2.00	0	1	1
Total		12	13	25

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.962	1	.327
N of Valid Cases	25		

In complex figure test – delayed recall 12 patients with less than three episodes of illness and 12 patients with more than three episodes of illness had deficits.

There is no significant difference between the two groups is noted in complex figure test. The p value is 0.327.



The bar diagram shows the number of patients with and without deficits in the two groups within bipolar affective disorder patients with number of episodes of illness: less than 3 and more than 3.

1.00 Represents patients with deficits.

2.00 Represents patients without deficits

COMPARATIVE ANALYSIS OF QUALITY OF LIFE IN CLINICALLY STABLE SCHIZOPHRENIA AND EUTHYMIC BIPOLAR AFFECTIVE DISORDER:

Quality of life is assessed using WHO QOL BREF rating scale. It has four domains which includes the following:

1) Physical health

2) Psychological

3) Social relationship

4) Environment

QOL-DOMAINS	t-test for Equality of Means		
	t	df	Sig. (2-tailed)
PHYSICAL HEALTH	-.772	48	.444
PSYCHOLOGICAL	.402	48	.689
SOCIAL RELATIONSHIP	.286	48	.776
ENVIRONMENT	-.888	48	.379

The four domains of quality of life were assessed for the two groups – schizophrenia and BPAD using t test for equality of means. There were no significant-differences between the two groups in all the four domains of quality of life namely physical health, psychological, social relationship and environment.

DISCUSSION:

Neurocognitive deficits are common in schizophrenia and bipolar affective disorder. These two illnesses are considered as major illness in the psychiatric practice due the prolonged course of illness. Neurocognitive deficit play a role in predicting quality of life.

In this study we considered patients who were clinically stable without active symptoms in view of getting the neurocognitive deficits and level of quality of life.

Patients with diagnosis of schizophrenia and bipolar affective disorder who attend the psychiatry out- patient department, who met the inclusion criteria entered the study. Each patient is assessed for neurocognition and quality of life. A total of 50 patients completed the study with 25 patients in each group.

In socio- demographic variables both the groups were comparable. These included age, gender, marital status and education.

The neurocognitive assessment had eight tests which are used to assess various domains of neurocognition namely speed, attention, executive function, verbal learning and memory, visuospatial construction and visual memory. Each of these functions activates various brain regions and hence plays an important role in the structural changes that happens in schizophrenia and bipolar disorder.

Quality of life is assessed using WHO QOL BREF scale which is a standardised tool which is self administered to the patients.

NEUROCOGNITION IN CLINICALLY STABLE SCHIZOPHRENIA AND EUTHYMIC BIPOLAR AFFECTIVE DISORDER:

Auditory verbal learning test is used to measure verbal learning and memory. This shows 56% of patients in schizophrenia group and 40% of patients with BPAD are having deficits. There is no significant difference between the two groups.

Digit vigilance test is used to measure attention. This shows deficits in 52% and 24% in schizophrenia and BPAD group respectively. There is no significant difference between the two groups and the p value is 0.267 which is >0.005.

Digit symbol substitution test measures the speed. This shows deficits in 48% and 32% in schizophrenia and BPAD group respectively. There is no significant difference between the two groups and the p value is 0.172 which is >0.005.

Animal naming test, COWA test, verbal N back test and stroop test are the various tests used to measure the executive function.

In animal naming test 44% of patients with schizophrenia and 36 % of patients with BPAD had deficits. There is no significant difference between the two groups. The p value is 0.732. In

COWA test 4% of patients with schizophrenia and 12% of patients with BPAD had deficits. There is no significant difference between the two groups. The p value is 0.384.

In verbal N back test which includes both 1 back and 2 -back test did not show any significant difference between the two groups.

Complex figure test is used to measure visuo spatial construction and visual memory. It comprises immediate and delayed recall.

The complex figure test did not show any significant difference between the two groups. The p value is 0.646 and 0.364 for immediate recall and delayed recall respectively.

In all the above neurocognitive domains both the groups had significant number of patients with deficits. This is similar to the previous studies where attention, executive function and memory deficits were found in both schizophrenia and bipolar disorder.

The between group analysis did not show any significant difference between any of the cognitive domains in the two diseases.

With these results the neurocognitive dysfunction is similar in both schizophrenia and bipolar disorder when they are clinically stable and euthymic respectively.

In the review of similar studies there was difference between the two groups in that schizophrenia group had significant neurocognitive deficits when compared to bipolar disorder.

NEUROCOGNITION AND DURATION OF ILLNESS IN SCHIZOPHRENIA:

In the schizophrenia group, among 25 patients, 16 patients had schizophrenia for more than 5 years and the remaining 9 patients had the illness for less than 5 years.

We analysed the neurocognition within the schizophrenia group that is patients with illness less than 5 years and more than 5 years.

In auditory verbal learning test – delayed recall, 5 patients had deficits in the less than 5 years group and 9 patients had deficits in more than 5 years illness group. There is no statistical significance between the two groups.

In digit vigilance test, 3 patients from less than 5 years illness group and 10 patients from more than 5 years illness group had deficits which is not statistically significant and the p value is 0.161.

In digit symbol substitution test, 3 patients from less than 5 years group and 9 patients from more than 5 years group had deficits and the p value is 0.271. This is not statistically significant.

Animal naming test and COWA test which are used to measure the executive functions did not show any significant difference between the two groups of patients with illness less than 5 years and more than 5 years. The p value is 0.100 and 0.444 for animal naming test and COWA test respectively.

In verbal N back test, including 1 Back and 2 Back test there is no significant difference between the two groups. The p value is 0.656 and 0.790 respectively.

Complex figure test- delayed recall did not show any significant difference between the two groups. The p value is 0.667.

In the previous studies it was shown that the neurocognitive deficits remain stable throughout the course of illness and we also find no significant difference between the two groups.

NEUROCOGNITION AND NUMBER OF AFFECTIVE EPISODES IN BIPOLAR DISORDER:

In the bipolar affective group patients we did a sub analysis by grouping them into two:

- More than 3 affective episodes in the past.
- Less than 3 affective episodes in the past.

In the bipolar affective disorder group 52% had more than 3 episodes of illness and 48% had less than 3 episodes of illness.

The neurocognitive domains such as speed, attention, executive functions, verbal learning and memory, visuo-spatial construction and visual memory were assessed using standard neuropsychological tests as mentioned above. In the assessment there was no significant difference between the two groups statistically.

QUALITY OF LIFE IN CLINICALLY STABLE SCHIZOPHRENIA AND EUTHYMIC BIPOLAR AFFECTIVE DISORDER:

Quality of life is assessed using WHO QOL BREF which is a self administered 26 items questionnaire. The 26 questions are divided into four domains namely physical health, psychological, social relationship and environment.

In the analysis, there is no significant difference between the two groups in any of the four domains of quality of life. This suggests same level of functioning in the two groups of patients when they are clinically stable. With this we suggest a possibility that the cognitive deficits may not predict the quality of life.

In the past studies have shown that neurocognition is a good predictor of level of functioning and quality of life and there was significant difference between the two groups of patients. This is not supported by our study.

LIMITATIONS:

In this study we have certain limitations. Small sample size is one of the limitations in our study. Convenient sampling is another bias as there is a chance of missing patients with more severe cognitive deficits in the sample. Inclusion of healthy volunteers as control group would have provided a comparison between neurocognitive function between normal individuals and people with major psychiatric illness. Being a cross sectional study the cause and effect relationship between the neurocognitive dysfunction and quality of life between the psychiatric illnesses cannot be assessed

CONCLUSION:

In this study we wanted to highlight that there is no difference between clinically stable schizophrenia and euthymic bipolar affective disorder in neurocognitive function and quality of life but there were significant cognitive deficits within the two groups.

It is important to address the neurocognitive deficits which are seen in both the groups even when they are clinically stable or euthymic. It is important to assess the cognitive deficits clinically to all patients with the above illness. After assessment it is necessary to intervene with various measures. Cognitive remediation programs and cognitive enhancers are showing improvement in neurocognition and hence intervention can be suggested. By addressing the neurocognitive dysfunction, we can also improve the compliance.

Future studies should focus on treatment of cognitive dysfunction and measuring the outcome of overall treatment.

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ANNEXURE:

PATIENT INFORMATION PROFORMA:

NAME	
OP NUMBER	
AGE	
SEX	
MARITAL STATUS	
DURATION OF ILLNESS	
DURATION OF TREATMENT	
NO. OF HOSPITALIZATION	
TREATMENT DETAILS OF PAST 3 MONTHS	
PANSS/HAMD/YMRS SCORE	
NEUROCOGNITIVE ASSESSMENT	
WHO QOL-BREF SCORE	

P A N S S R A T I N G F O R M

		absent	minimal	mild	moderate	moderate severe	severe	extreme
P1	Delusions	1	2	3	4	5	6	7
P2	Conceptual disorganisation	1	2	3	4	5	6	7
P3	Hallucinatory behaviour	1	2	3	4	5	6	7
P4	Excitement	1	2	3	4	5	6	7
P5	Grandiosity	1	2	3	4	5	6	7
P6	Suspiciousness/persecution	1	2	3	4	5	6	7
P7	Hostility	1	2	3	4	5	6	7
N1	Blunted affect	1	2	3	4	5	6	7
N2	Emotional withdrawal	1	2	3	4	5	6	7
N3	Poor rapport	1	2	3	4	5	6	7
N4	Passive/apathetic social Withdrawal	1	2	3	4	5	6	7
N5	Difficulty in abstract thinking	1	2	3	4	5	6	7
N6	Lack of spontaneity & flow of conversation	1	2	3	4	5	6	7
N7	Stereotyped thinking	1	2	3	4	5	6	7
G1	Somatic concern	1	2	3	4	5	6	7
G2	Anxiety	1	2	3	4	5	6	7
G3	Guilt feelings	1	2	3	4	5	6	7
G4	Tension	1	2	3	4	5	6	7
G5	Mannerisms & posturing	1	2	3	4	5	6	7
G6	Depression	1	2	3	4	5	6	7
G7	Motor retardation	1	2	3	4	5	6	7
G8	Uncooperativeness	1	2	3	4	5	6	7
G9	Unusual thought content	1	2	3	4	5	6	7
G10	Disorientation	1	2	3	4	5	6	7
G11	Poor attention	1	2	3	4	5	6	7
G12	Lack of judgement & insight	1	2	3	4	5	6	7
G13	Disturbance of volition	1	2	3	4	5	6	7
G14	Poor impulse control	1	2	3	4	5	6	7
G15	Preoccupation	1	2	3	4	5	6	7
G16	Active social avoidance	1	2	3	4	5	6	7

Young Mania Rating Scale (YMRS)

Enter the appropriate score which best characterizes the subject for each item.

Item	*Explanation*
1. Elevated mood	0 Absent
	1 mildly or possibly increased on questioning
	definite subjective elevation: optimistic, self-confident; cheerful;
	2 appropriate to content
	3 elevated, inappropriate to content; humorous
	4 euphoric, inappropriate laughter singing
Increased motor activity	
2. energy	0 Absent
	1 subjectively increased
	2 animated; gestures increased
	3 excessive energy; hyperactive at times; restless (can be calmed)
	4 motor excitement; continues hyperactivity (cannot be calmed)
3. Sexual interest	0 normal; not increased
	1 mildly or possibly increased
	2 definite subjective increase on questioning
	spontaneous sexual content; elaborates on sexual matters;
	3 hypersexual by self-report

	4	overt sexual acts (toward subjects, staff, or interviewer)
4. Sleep	0	reports no decrease in sleep
	1	sleeping less than normal amount by up to one hour
	2	sleeping less than normal by more than one hour
	3	reports decreased need for sleep
	4	denies need for sleep
5. Irritability	0	absent
	2	subjectively increased
		irritable at times during interview; recent episodes of anger or
	4	annoyance on ward
	6	frequently irritable during interview; short, curt throughout
	8	hostile, uncooperative; interview impossible
6. Speech (rate and amount)	0	no increase
	2	feels talkative
	4	increased rate or amount at times, verbose at times
	6	push; consistently increased rate and amount; difficult to interpret
	8	pressured; uninterruptible; continuous speech
Language-thought		
7. disorder	0	absent
	1	circumstantial; mild distractibility; quick thoughts
		distractible; loses goal of thought; changes topics frequently; racing
	2	thoughts
	3	flight of ideas; tangentiality; difficult to follow; rhyming; echolalia
	4	incoherent; communication impossible
8. Content	0	normal
	2	questionable plans, new interests

	4	special project(s); hyperreligious
	6	grandiose or paranoid ideas; ideas of reference
	8	delusions; hallucinations
Disruptive-aggressive		
9. behaviour	0	absent, cooperative
	2	sarcastic; loud at times, guarded
	4	demanding; threats on ward
	6	threatens interviewer shouting; interview difficult
	8	assaultive; destructive; interview impossible
10. Appearance	0	appropriate dress and grooming
	1	minimally unkempt
	2	poorly groomed; moderately disheveled; overdressed
	3	disheveled; partly clothed; garish make-up
	4	completely unkempt; decorated; bizarre garb
11. Insight	0	present; admits illness; agrees with need for treatment
	1	possibly ill
	2	admits behaviour change, but denies illness
	3	admits possible change in behaviour, but denies illness
	4	denies any behaviour change

Table 9–15
Hamilton Rating Scale for Depression

For each item select the "cue" which best characterizes the patient.

1: Depressed Mood (Sadness, hopeless, helpless, worthless)
- 0 Absent
- 1 These feeling states indicated only on questioning
- 2 These feeling states spontaneously reported verbally
- 3 Communicates feeling states nonverbally—ie, through facial expression, posture, voice, and tendency to weep
- 4 Patient reports VIRTUALLY ONLY these feeling states in his spontaneous verbal and nonverbal communication

2: Feelings of Guilt
- 0 Absent
- 1 Self-reproach, feels he has let people down
- 2 Ideas of guilt or rumination over past errors or sinful deeds
- 3 Present illness is a punishment. Delusions of guilt
- 4 Hears accusatory or denunciatory voices and/or experiences threatening visual hallucinations

3: Suicide
- 0 Absent
- 1 Feels life is not worth living
- 2 Wishes he were dead or any thoughts of possible death to self
- 3 Suicide ideas or gesture
- 4 Attempts at suicide (any serious attempt rates 4)

4: Insomnia early
- 0 No difficulty falling asleep
- 1 Complains of occasional difficulty falling asleep—ie, more than ½ hour
- 2 Complains of nightly difficulty falling asleep

5: Insomnia middle
- 0 No difficulty
- 1 Patient complains of being restless and disturbed during the night
- 2 Waking during the night—any getting out of bed rates 2 (except for purpose of voiding)

6: Insomnia late
- 0 No difficulty
- 1 Waking in early hours of the morning but goes back to sleep
- 2 Unable to fall asleep again if gets out of bed

7: Work and activities
- 0 No difficulty
- 1 Thoughts and feelings of incapacity, fatigue or weakness related to activities, work, or hobbies
- 2 Loss of interest in activity, hobbies, or work—either directly reported by patient, or indirect in listlessness, indecision and vacillation (feels he has to push self to work or activities)
- 3 Decrease in actual time spent in activities or decrease in productivity. In hospital, rate 3 if patient does not spend at least three hours a day in activities (hospital job or hobbies) exclusive of ward chores
- 4 Stopped working because of present illness. In hospital, rate 4 if patient engages in no activities except ward chores, or if patient fails to perform ward chores unassisted

8: Retardation (Slowness of thought and speech; impaired ability to concentrate; decreased motor activity)
- 0 Normal speech and thought
- 1 Slight retardation at interview
- 2 Obvious retardation at interview
- 3 Interview difficult
- 4 Complete stupor

9: Agitation
- 0 None
- 1 "Playing with" hands, hair, etc
- 2 Hand-wringing, nail biting, hair pulling, biting of lips

10: Anxiety psychic
- 0 No difficulty
- 1 Subjective tension and irritability
- 2 Worrying about minor matters
- 3 Apprehensive attitude apparent in face or speech
- 4 Fears expressed without questioning

11: Anxiety somatic

0 Absent	Physiological concomitants of anxiety, such as:
1 Mild	Gastrointestinal—dry mouth, wind, indigestion, diarrhea, cramps, belching
2 Moderate	Cardiovascular—palpitations, headaches
3 Severe	Respiratory—hyperventilation, sighing
4 Incapacitating	Urinary frequency
	Sweating

12: Somatic symptoms gastrointestinal
- 0 None
- 1 Loss of appetite but eating without staff encouragement. Heavy feelings in abdomen
- 2 Difficulty eating without staff urging. Requests or requires laxatives or medication for bowels or medication for GI symptoms

13: Somatic symptoms general
- 0 None
- 1 Heaviness in limbs, back or head. Backaches, headache, muscle aches. Loss of energy and fatigability
- 2 Any clear cut symptom rates 2

14: Genital symptoms

0 Absent	Symptoms such as:
1 Mild	Loss of libido
2 Severe	Menstrual disturbances

15: Hypochondriasis
- 0 Not present
- 1 Self-absorption (bodily)
- 2 Preoccupation with health

16: Loss of weight
- A When rating by history
  - 0 No weight loss
  - 1 Probable weight loss associated with present illness
  - 2 Definite (according to patient) weight loss
- B On weekly ratings by ward psychiatrist, when actual weight changes are measured
  - 0 Less than 1 lb weight loss in week
  - 1 Greater than 1 lb weight loss in week
  - 2 Greater than 2 lb weight loss in week

17: Insight
- 0 Acknowledges being depressed and ill
- 1 Acknowledges illness but attributes cause to bad food, climate, overwork, virus, need for rest, etc
- 2 Denies being ill at all

18: Diurnal variation

AM	PM		
0	0	Absent	If symptoms are worse in the morning or evening, note which it is and rate severity of variation
1	1	Mild	
2	2	Severe	

19: Depersonalization and derealization

0 Absent	
1 Mild	Such as:
2 Moderate	Feeling of unreality
3 Severe	Nihilistic ideas
4 Incapacitating	

20: Paranoid symptoms
- 0 None
- 1
- 2 Suspiciousness
- 3 Ideas of reference
- 4 Delusions of reference and persecution

21: Obsessional and compulsive symptoms
- 0 Absent
- 1 Mild
- 2 Severe

22: Helplessness
- 0 Not present
- 1 Subjective feelings which are elicited only by inquiry
- 2 Patient volunteers his helpless feelings
- 3 Requires urging, guidance, and reassurance to accomplish ward chores or personal hygiene
- 4 Requires physical assistance for dress, grooming, eating, bedside tasks, or personal hygiene

23: Hopelessness
- 0 Not present
- 1 Intermittently doubts that "things will improve" but can be reassured
- 2 Consistently feels "hopeless" but accepts reassurances
- 3 Expresses feelings of discouragement, despair, pessimism about future, which cannot be dispelled
- 4 Spontaneously and inappropriately perseverates "I'll never get well" or its equivalent

24: Worthlessness (Ranges from mild loss of esteem, feelings of inferiority, self-deprecation to delusional notions of worthlessness)
- 0 Not present
- 1 Indicates feelings of worthlessness (loss of self-esteem) only on questioning
- 2 Spontaneously indicates feelings of worthlessness (loss of self-esteem)
- 3 Different from 2 by degree. Patient volunteers that he is "no good," "inferior," etc
- 4 Delusional notions of worthlessness—ie, "I am a heap of garbage" or its equivalent

AUDITORY – VERBAL LEARNING TEST

DATE:

Tamil Version

S.No.	LIST-A	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	LIST B		IR-A	DR-A	Recognition
1	Kendakai						Kaalani				**Hits**
2	Poonai						Korangu				Kannadi
3	Kodali						Kinnam				**Suthiyel**
4	Padukai						Maadu				**Kathee**
5	Vaanurthi						Viral				Melaguvarthi
6	Kathu						Aadai				Scooter
7	Nayi						Ettakalpuchi				**Kodali**
8	Suthiyel						Tumbler				**Gadikaram**
9	Narkali						Theynee				**Narkali**
10	Car						Paadham				**Vannurthi**
11	Kannu						Thopi				Aamey
12	Kudirai						Pattampuchi				Kaalu
13	kathee						Kettle				**Naayi**
14	Gadikaram						Eli				Mejai
15	Bike						Kai				**Poonai**
											Udhadu
											Maram
											Kendakai
											Mooku
											Sooryan
											Lorry
											Kannu
											Meen
											Kadhu
											Kudurai
											Bike
											Stool
											Perundhu
											Padukai
											Car

Total Scores

Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	List B	IR-A	DR	Recognition	
								HITS	
								OMISSION	
								COMMISSION	

DVT

9	5	3	6	4	7	2	8	1	9	2	8	6	2	4	1	2	4	6	8	9	7	3	5	1	8	5	4	2	9
8	4	2	1	3	5	6	1	9	7	5	6	3	8	2	3	9	7	4	1	2	3	4	5	6	7	8	9	1	2
1	7	4	8	6	3	2	9	7	1	4	3	2	5	9	5	7	8	6	3	4	5	6	1	7	2	8	3	9	4
6	1	3	2	9	4	6	5	8	7	3	1	9	5	1	7	5	9	8	1	7	2	8	3	9	4	1	5	2	6
4	6	7	1	5	3	2	9	1	8	6	4	2	8	6	9	3	1	5	3	1	4	2	5	3	6	4	7	5	8
2	3	8	2	6	9	7	4	9	1	3	8	6	9	2	2	1	3	8	6	3	7	4	8	5	9	6	1	7	2
5	8	9	3	1	7	2	6	8	4	1	3	5	7	9	4	8	2	9	4	8	5	9	6	1	7	2	8	3	9
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6	2	3	5	7	9	1	4	8	2	4	1	3	7	9	8	2	5	2	9	3	1	7	4	2	5	7	6	3	5
9	2	5	6	1	3	7	2	4	6	1	7	8	3	5	9	4	6	3	1	8	5	2	9	6	3	1	4	2	7
8	3	7	8	2	6	4	9	1	5	7	2	4	6	8	7	9	8	4	6	9	1	4	7	1	2	5	8	4	3
7	4	9	7	1	3	5	2	4	6	9	8	1	3	7	5	7	9	6	1	6	3	8	4	9	5	1	6	2	7
4	5	2	9	2	1	3	7	9	8	2	6	2	4	1	3	5	7	8	3	7	8	3	9	4	1	5	2	6	7
2	6	4	1	9	4	3	5	7	1	4	7	3	1	4	1	3	9	5	7	8	1	6	2	7	3	8	4	9	5
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3	8	2	5	6	4	2	8	7	2	6	9	7	3	8	6	2	8	7	9	1	2	3	5	3	9	1	7	3	4
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1	7	4	9	5	6	8	3	2	1	3	5	7	8	2	2	6	5	3	4	2	6	7	9	4	1	2	8	4	5
6	5	8	2	1	3	9	7	4	9	7	5	3	1	8	5	4	3	2	6	4	8	9	2	9	5	7	3	9	1
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2	3	8	2	6	9	7	4	9	1	3	8	6	9	2	2	1	3	8	6	3	7	4	8	5	9	6	1	7	2
5	8	9	3	1	7	2	6	8	4	1	3	5	7	9	4	8	2	9	4	8	5	9	6	1	7	2	8	3	9
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4	5	2	9	2	1	3	7	9	8	2	6	2	4	1	3	5	7	8	3	7	8	3	9	4	1	5	2	6	7
2	6	4	1	9	4	3	5	7	1	4	7	3	1	4	1	3	9	5	7	8	1	6	2	7	3	8	4	9	5
5	7	6	3	1	9	6	5	6	3	5	8	6	2	5	8	1	7	9	5	9	2	4	6	8	1	3	5	7	9
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1	7	4	9	5	6	8	3	2	1	3	5	7	8	2	2	6	5	3	4	2	6	7	9	4	1	2	8	4	5
6	5	8	2	1	3	9	7	4	9	7	5	3	1	8	5	4	3	2	6	4	8	9	2	9	5	7	3	9	1
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1	3	9	5	4	8	2	5	2	8	4	2	8	8	9	4	5	1	7	3	8	7	8	1	2	7	9	5	2	3
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6	4	2	9	3	6	9	3	4	1	7	4	1	3	4	2	6	3	9	5	2	1	3	4	3	8	1	6	3	4

Time taken: Errors: S_____ O_____

DIGIT SYMBOL SUBSTITUTION TEST

1	2	3	4	5	6	7	8	9
—	⊥	⊐	L	U	O	^	X	=

2	1	3	7	2	4	8	1	5	4	2	1	3	2	1	4	2	3	5	2	3	1	4	6	3

1	5	4	2	7	6	3	5	7	2	8	5	4	6	3	7	2	8	1	9	5	8	4	7	3

6	2	5	1	9	2	8	3	7	4	6	5	9	4	8	3	7	2	6	1	5	4	6	3	7

9	2	8	1	7	9	4	6	8	5	9	7	1	8	5	2	9	4	8	6	3	7	9	8	6

ANIMAL NAMING TEST

Total Score:

COWA TEST

F (*ka*)	A (*pa*)	S (*ma*)
Total:	Total:	Total:
	Average no. of new words:	

STROOP TEST

Stroop effect score = Time taken to name (sec) – Time taken to read the word (C – W)

→ Columnwise.
→ NO. OF ERRORS.

RED	BLUE	GREEN	RED	BLUE
GREEN	GREEN	RED	BLUE	GREEN
BLUE	RED	BLUE	GREEN	RED
GREEN	BLUE	RED	RED	BLUE
RED	RED	GREEN	BLUE	GREEN
BLUE	GREEN	BLUE	GREEN	RED
RED	BLUE	GREEN	BLUE	GREEN
BLUE	GREEN	RED	GREEN	RED
GREEN	RED	BLUE	RED	BLUE
BLUE	GREEN	GREEN	BLUE	GREEN
GREEN	RED	BLUE	RED	RED
RED	BLUE	RED	GREEN	BLUE
GREEN	RED	BLUE	RED	GREEN
BLUE	BLUE	RED	GREEN	RED
RED	GREEN	GREEN	BLUE	BLUE
BLUE	BLUE	RED	GREEN	RED
RED	GREEN	BLUE	RED	GREEN
GREEN	RED	GREEN	BLUE	BLUE
RED	BLUE	RED	GREEN	RED
GREEN	RED	GREEN	BLUE	GREEN

சிவப்பு	நீலம்	பச்சை	சிவப்பு	நீலம்
பச்சை	பச்சை	சிவப்பு	நீலம்	பச்சை
நீலம்	சிவப்பு	நீலம்	பச்சை	சிவப்பு
பச்சை	நீலம்	சிவப்பு	சிவப்பு	நீலம்
சிவப்பு	சிவப்பு	பச்சை	நீலம்	பச்சை
நீலம்	பச்சை	நீலம்	பச்சை	சிவப்பு
சிவப்பு	நீலம்	பச்சை	நீலம்	பச்சை
நீலம்	பச்சை	சிவப்பு	பச்சை	சிவப்பு
பச்சை	சிவப்பு	நீலம்	சிவப்பு	நீலம்
நீலம்	பச்சை	பச்சை	நீலம்	பச்சை
பச்சை	சிவப்பு	நீலம்	சிவப்பு	சிவப்பு
சிவப்பு	நீலம்	சிவப்பு	பச்சை	நீலம்
பச்சை	சிவப்பு	நீலம்	சிவப்பு	பச்சை
நீலம்	நீலம்	சிவப்பு	பச்சை	சிவப்பு
சிவப்பு	பச்சை	பச்சை	நீலம்	நீலம்
நீலம்	நீலம்	சிவப்பு	பச்சை	சிவப்பு
சிவப்பு	பச்சை	நீலம்	சிவப்பு	பச்சை
பச்சை	சிவப்பு	பச்சை	நீலம்	நீலம்
சிவப்பு	நீலம்	சிவப்பு	பச்சை	சிவப்பு
பச்சை	சிவப்பு	பச்சை	நீலம்	பச்சை

VERBAL WORKING MEMORY

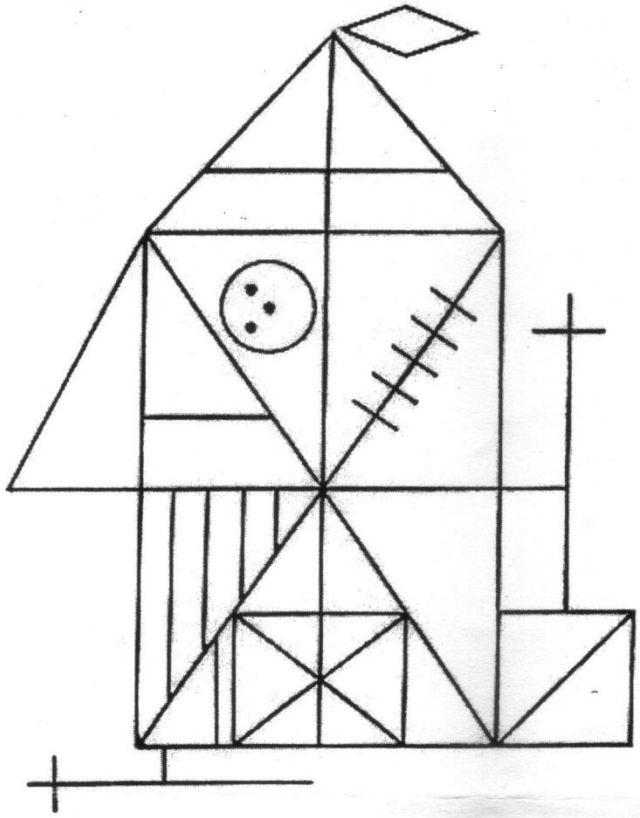
1 BACK

1	GA	
2	JA	
3	**JA**	
4	CHA	
5	HA	
6	**HA**	
7	SHA	
8	RA	
9	NA	
10	MA	
11	**MA**	
12	KA	
13	PA	
14	**PA**	
15	LA	
16	VA	
17	TA	
18	**TA**	
19	LA	
20	PA	
21	VA	
22	**VA**	
23	DA	
24	**DA**	
25	CHA	
26	SHA	
27	**SHA**	
28	GA	
29	YA	
30	**YA**	

2 BACK

1	NA	
2	GA	
3	**NA**	
4	MA	
5	LA	
6	JA	
7	**LA**	
8	MA	
9	KA	
10	LA	
11	**KA**	
12	JA	
13	YA	
14	MA	
15	**YA**	
16	DHA	
17	BHA	
18	**DHA**	
19	VA	
20	SHA	
21	**VA**	
22	GA	
23	**VA**	
24	**GA**	
25	DA	
26	NA	
27	**DA**	
28	CHA	
29	RA	
30	MA	

	H	**O**	**C**	**ERROR (O+C)**
1 BACK				
2 BACK				



Please read each question, assess your feelings, and circle the number on the scale for each question that gives the best answer for you.

		Very poor	Poor	Neither poor nor good	Good	Very good
1(G1)	How would you rate your quality of life?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2 (G4)	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last two weeks.

		Not at all	A little	A moderate amount	Very much	An extreme amount
3 (F1.4)	To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4(F11.3)	How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
5(F4.1)	How much do you enjoy life?	1	2	3	4	5
6(F24.2)	To what extent do you feel your life to be meaningful?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7(F5.3)	How well are you able to concentrate?	1	2	3	4	5
8 (F16.1)	How safe do you feel in your daily life?	1	2	3	4	5
9 (F22.1)	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about **how completely** you experience or were able to do certain things in the last two weeks.

		Not at all	A little	Moderately	Mostly	Completely
10 (F2.1)	Do you have enough energy for everyday life?	1	2	3	4	5
11 (F7.1)	Are you able to accept your bodily appearance?	1	2	3	4	5
12 (F18.1)	Have you enough money to meet your needs?	1	2	3	4	5
13 (F20.1)	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
14 (F21.1)	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

		Very poor	Poor	Neither	Good	Very good

				poor nor good		
15 (F9.1)	How well are you able to get around?	1	2	3	4	5

The following questions ask you to say how **good or satisfied** you have felt about various aspects of

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16 (F3.3)	How satisfied are you with your sleep?	1	2	3	4	5
17 (F10.3)	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18(F12.4)	How satisfied are you with your capacity for work?	1	2	3	4	5
19 (F6.3)	How satisfied are you with yourself?	1	2	3	4	5
20(F13.3)	How satisfied are you with your personal relationships?	1	2	3	4	5
21(F15.3)	How satisfied are you with your sex life?	1	2	3	4	5
22(F14.4)	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23(F17.3)	How satisfied are you with the conditions of your living place?	1	2	3	4	5
24(F19.3)	How satisfied are you with your access to health services?	1	2	3	4	5
25(F23.3)	How satisfied are you with your transport?	1	2	3	4	5

your life over the last two weeks.

The following question refers to **how often** you have felt or experienced certain things in the last two weeks.

		Never	Seldom	Quite often	Very often	Always
26 (F8.1)	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	1	2	3	4	5

1. உங்கள் வாழ்க்கைத் தரத்தை நீங்கள் எந்த அளவிற்கு மதிப்பிடுகிறீர்கள்?
2. உங்கள் ஆரோக்கியத்தில் எந்த அளவிற்கு நீங்கள் திருப்தியாய் இருக்கிறீர்கள்?
3. எந்த அளவிற்கு உங்கள் உடல் வலி நீங்கள் செய்ய வேண்டிய வேலையை செய்ய விடாமல் தடுக்கிறது?
4. உங்களது அன்றாட வாழ்க்கையில் இயங்குவதற்கு எந்த அளவிற்கு ஏதாவது மருத்துவசிகிச்சை அவசியமாக இருக்கிறது?
5. நீங்கள் எந்த அளவிற்கு உங்கள் வாழ்க்கையை சந்தோசமாக அனுபவிக்கிறீர்கள்?
6. நீங்கள் எந்த அளவிற்கு உங்கள் வாழ்க்கை அர்த்தமுள்ளதாக இருக்கிறது என்று நினைக்கிறீர்கள்?
7. எந்த அளவிற்கு உங்களால் கவனம் செலுத்த முடியும்?
8. உங்கள் வாழ்க்கையில் எந்த அளவிற்கு நீங்கள் பாதுகப்பாக இருக்கிறீர்கள் என்று உணர்கிறீர்கள்?
9. எந்த அளவிற்கு உங்களின் உடம்பின் சுற்றுப்புறச்சூழல் இருக்கிறது?
10. அன்றாட வாழ்க்கைக்கு போதுமான சக்தி / ஆற்றல் உங்களிடம் இருக்கிறதா?
11. உங்கள் உடல் சம்பந்தமான தோற்றத்தை உங்களால் ஏற்றுக்கொள்ள முடிகிறதா?
12. உங்கள் தேவையை பூர்த்தி செய்வதற்கு உங்களிடம் போதுமான பணம் இருக்கிறதா?
13. உங்களது அன்றாட வாழ்க்கையில், உங்களுக்கு தேவையான தகவல்கள் எந்த அளவிற்கு கிடைக்கிறது?
14. ஓய்வுநேர நடவடிக்கைகளுக்காக எந்த அளவிற்கு உங்களுக்கு வாய்ப்பு இருக்கிறது?
15. எந்த அளவிற்கு நன்றாக சுற்றி இருப்பவர்களிடம் உங்களால் பழக முடியும்?
16. எந்த அளவிற்கு உங்களுக்கு இருக்கும் தூக்கம் திருப்தியாக இருக்கிறது?
17. அன்றாட நடக்கும் நடவடிக்கைகளை நிறைவேற்றக்கூடிய திறமையில் உங்களுக்கு எந்த அளவுக்கு திருப்தியாக இருக்கிறது?
18. உங்களது வேலை செய்யும் திறமை எந்த அளவிற்கு திருப்தியாக இருக்கிறது?
19. நீங்கள் எந்த அளவிற்கு உங்களோடு திருப்தியாக இருக்கிறீர்கள்?
20. எந்த அளவுக்கு நீங்கள் சொந்த உறவுகளிடம் திருப்தியாக இருக்கிறீர்கள்?
21. உங்கள் வாழ்க்கையில் எந்த அளவுக்கு உடலுறவு வாழ்க்கை திருப்தியாக இருக்கிறது?
22. நீங்கள் உங்கள் நண்பர்களிடமிருந்து கிடைக்கும் ஆதரவு எந்த அளவுக்கு திருப்தியாக உள்ளது?
23. நீங்கள் வசிக்கும் இடத்தில் சுற்றுப்புறச்சூழல் அல்லது நிலைகள் எந்த அளவுக்கு திருப்தியாக இருக்கிறது?

24. நீங்கள் சுகாதார வசதிகள் அல்லது சேவைகளை அடைவதற்கு எந்த அளவுக்கு திருப்தியாக இருக்கிறது?
25. உங்களுக்கு போக்குவரத்து வசதிகள் எந்த அளவுக்கு திருப்தியாக இருக்கிறது?
26. உங்களுக்கு எந்த அளவுக்கு எதிர்மறையான எண்ணங்கள், அதாவது வருத்தம், கவலை, பயம் மற்றும் மனச்சோர்வு இருக்கிறது?

Study Volunteer ID:
Study Volunteer Name:

PSG Institute of Medical Science and Research, Coimbatore
Institutional Human Ethics Committee
INFORMED CONSENT FORMAT FOR RESEARCH PROJECTS

(strike off items that are not applicable)

I , DR.G.POORANI, am carrying out a study on the topic: Neurocognitive function and quality of life in patients with clinically stable schizophrenia and euthymic bipolar affective disorder attending psychiatric outpatient department as part of my / our research project being carried out under the Department of PSYCHIATRY.

(*Applicable to students only*): My / our research guide is: DR.I.ANAND

The objectives of this study are:

Primary Objective:. The aim of the study is to assess and compare the neurocognitive functions among patients with clinically stable schizophrenia and euthymic bipolar affective disorder.

Secondary Objective: To compare the quality of life and its relation to neurocognitive deficits.

- **Sample size**: 25 / Group (Total – 50).

Study volunteers / participants are (specify population group & age group):Patients.Age group is 17 – 50 years

Location: PSGIMSR

We request you to kindly cooperate with us in this study. We propose collect background information and other relevant details related to this study. We will be carrying out:

Initial interview (specify approximate duration):45-60 minutes.

Data collected will be stored for a period of fifteen years. We will / will not use the data as part of another study.

Health education sessions: Number of sessions: _____. Approximate **duration** of each session:

_____ minutes.

Clinical examination (Specify details and purpose):

Blood sample collection: Specify quantity of blood being drawn: _____ml.

No. of times it will be collected: _____.

Whether blood sample collection is part of routine procedure or for research (study) purpose:

1. Routine procedure 2. Research purpose

Specify **purpose**, discomfort likely to be felt and side effects, if any: _____

Whether blood sample collected will be stored after study period: Yes / No, it will be destroyed

Whether blood sample collected will be sold: Yes / No

Whether blood sample collected will be shared with persons from another institution: Yes / No

Medication given, if any, duration, side effects, purpose, benefits:

Whether medication given is part of routine procedure: Yes / No (If not, state reasons for giving this medication)

Whether alternatives are available for medication given: Yes / No (If not, state reasons for giving this particular medication)

Final interview (specify approximate duration):_____ mts. If **photograph** is taken, purpose:

Benefits from this study: to relate sexual dysfunction and psychiatric illness and thereby improve treatment, patient satisfaction and overall quality of life of patients.

Risks involved by participating in this study:nil

How the **results** will be used:

If you are uncomfortable in answering any of our questions during the course of the interview / biological sample collection, **you have the right to withdraw from the interview / study at anytime.** You have the freedom to withdraw from the study at any point of time. Kindly be assured that your refusal to participate or withdrawal at any stage, if you so decide, will not result in any form of compromise or discrimination in the services offered nor would it attract any penalty. You will continue to have access to the regular services offered to a patient. You will **NOT** be paid any remuneration for the time you spend with us for this interview / study. The information provided by you will be kept in strict confidence. Under no circumstances shall we reveal the identity of the respondent or their families to anyone. The information that we collect shall be used for approved research purposes only. You will be informed about any significant new findings - including adverse events, if any, – whether directly related to you or to other participants of this study, developed during the course of this research which may relate to your willingness to continue participation.

Consent: The above information regarding the study, has been read by me/ read to me, and has been explained to me by the investigator/s. Having understood the same, I hereby give my consent to them to

interview me. I am affixing my signature / left thumb impression to indicate my consent and willingness to participate in this study (i.e., willingly abide by the project requirements).

Signature / Left thumb impression of the Study Volunteer / Legal Representative:

Signature of the Interviewer with date: Witness:

Contact number of PI:

Contact number of Ethics Committee Office: 0422 2570170 Extn.: 5818

ஒப்புதல் படிவம்

தேதி :

டாக்டர் கோ. பூரணி, ஆகிய நான், பி. எஸ். ஜி. மருத்துவக் கல்லூரியின், மனநலத் துறையின் கீழ், **"மனச்சிதைவு மற்றும் மனஎழுச்சி / மனத்தளர்ச்சி நோயாளிகளின் நரம்பியல் புலனுணர்வு செயல்பாடு மற்றும் வாழ்க்கைத் தரம்"** என்ற தலைப்பின் கீழ் ஆய்வு மேற்கொள்ள உள்ளேன்.

என் ஆய்வு வழிகாட்டி: டாக்டர். ஐ. ஆனந்த்

ஆய்வு மேற்கொள்வதற்கான அடிப்படை:

மனச்சிதைவு மற்றும் மனஎழுச்சி / மனத்தளர்ச்சி நோயாளிகளின் நரம்பியல் புலனுணர்வு செயல்பாடு குறைகள் வெகுவாக காணப்படுகின்றன. ஆகையால் இந்த ஆய்வின் மூலம் அவற்றின் தன்மை மற்றும் வேறுபாடுகளை அறிந்து கொள்ளவிருக்கிறேன்.

ஆய்வின் நோக்கம்:

மனச்சிதைவு மற்றும் மனஎழுச்சி / மனத்தளர்ச்சி நோயாளிகளின் நரம்பியல் புலனுணர்வு செயல்பாடு மற்றும் வாழ்க்கை தரம் பற்றி தெரிந்து கொள்ளுதல். அதன்மூலம் இவ்விரு நோயாளிகளிள் காணப்படும் வேறுபாடுகளை அலசுதல்.

ஆய்வு மேற்கொள்ளும் இடம்: பி. எஸ். ஜி. மருத்துவமனை, கோயம்புத்தூர்.

ஆய்வின் பலன்கள்:

இவ்விரு வகை நோயாளிகளின் புலனுணர்வு குறைகள் மற்றும் வாழ்க்கைத் தரம் பற்றி அறிந்து கொள்வதால் அதனை நல்முறைப்படுத்த வாய்ப்பாக அமையும்.

இந்த ஆய்வில் கிடைக்கும் தகவல்கள் 5 வருடங்கள் பாதுகாக்கப்படும். இவை தேவைப்பட்டால் வேறு ஆய்விற்கும் பயன்படுத்தப்படலாம். எந்த நிலையிலும் உங்களைப் பற்றிய தகவல்கள் யாருக்கும் தெரிவிக்கப்படமாட்டாது. அவை இரகசியமாக வைக்கப்படும்.

இந்த ஆய்வில் பங்கேற்க ஒப்புக்கொள்வதால் எந்த விதமான பலனும் உங்களுக்கு கிடைக்காது. எந்த நேரத்தில் வேண்டுமானாலும் ஆய்விலிருந்து விலகிக்கொள்ளும் உரிமை உங்களுக்கு உண்டு.

ஆய்விலிருந்து விலகிக்கொள்வதால் உங்களுக்கு அளிக்கப்படும் சிகிச்சையில் எந்த வித மாற்றமும் இருக்காது.

இந்த ஆராய்ச்சிக்காக உங்களிடம் சில கேள்விகள் கேட்கப்படும்

மேலும், இந்த ஆய்வில் பங்கு கொள்வது உங்கள் சொந்த விருப்பம். இதில் எந்த விதக் கட்டாயமும் இல்லை. நீங்கள் விருப்பப் பட்டால், இந்த ஆய்வின் முடிவுகள் உங்களுக்குத் தெரியப் படுத்தப்படும்.

ஆய்வாளரின் கையொப்பம் :
தேதி :

ஆய்வுக்குட்படுபவரின் ஒப்புதல்:

நான் இந்த ஆராய்ச்சியின் நோக்கம் மற்றும் அதன் பயன்பாட்டினைப் பற்றி தெளிவாகவும், விளக்கமாகவும் தெரியப்படுத்தப் பட்டுள்ளேன். இந்த ஆராய்ச்சியில் பங்கு கொள்ளவும், இந்த ஆராய்ச்சியின் மருத்துவ ரீதியான குறிப்புகளை வரும் காலத்திலும் உபயோகப்படுத்திக் கொள்ளவும் முழு மனதுடன் சம்மதிக்கிறேன்.

ஆய்வுக்குட்படுபவரின் பெயர், முகவரி :

கையொப்பம் :
தேதி :

ஆய்வாளரின் தொலைபேசி எண்: 7708802110
மனித நெறிமுறைக் குழு அலுவலகத்தின் தொலைபேசி எண்: 0422 2570170 Extn.: 5818

S.No	Age	Sex	Marital status	Education	Duration of illness (years)	Duration of treatment (years)	No. of hospitalizations	Treatment details	PANSS	AVLT-DR	AVLT-LTPR	DVT	DST	Animal naming test	COWA test	Stroop test	1 Back	1 Back error	2 Back	2 Back error	CFT-Copy	CFT-Immediate	CFT-Delayed	WHOQOL																									
									In Percentile															1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	60	F	Married	9th Std	25	10	0	T. Quetiapine 200 mg	25	15	5	5	15	40	23	70	23	15	31	<5	<5	<5	<5	4	4	2	3	3	4	4	4	4	4	4	4	3	4	4	4	4	4	4	3	3	4	4	4	2
2	43	F	Married	MA B.Ed	4	1.5	1	Inj. Fluphenazine Decanoate 25 mg Once in 2 weeks T. THP 2 mg	10	40	54	70	30	70	70	100	100	75	94	95	5	<5	<5	4	4	3	2	3	4	3	4	4	4	4	4	4	3	3	4	4	4	4	4	4	5	4	4	4	4	4	1
3	35	F	Married	Diploma	5	4	1	Inj. Haloperidol Decanoate 200 mg once a month T. THP 2 mg	5	10	9	27	15	40	23	95	100	20	55	15	<5	<5	<5	4	4	2	1	4	2	2	4	2	4	5	4	4	4	4	5	4	4	4	4	5	4	4	5	4	5	1
4	39	M	Single	10th Std	10	4	0	T. Olanzapine 20 mg	<5	70	6	3	15	10	32	20	57	5	38	20	<5	<5	<5	1	2	3	4	1	1	2	2	3	3	3	2	2	1	1	3	1	1	2	2	3	1	2	4	4	4
5	37	M	Single	ITI	10	5	2	T. Clozapine 400 mg T. Divalproate Sodium 1000 mg T. THP 4 mg	<5	<5	8	<3	40	20	27	30	21	0	<3	<5	<5	<5	<5	4	4	3	5	3	4	3	5	4	5	5	4	4	4	5	2	4	4	5	5	4	4	3	5	5	4	2
6	29	M	Single	Teacher tra	6	2	0	T. Risperidone 6 mg C. Vitamin E 2400 mg	5	25	29	18	5	30	52	5	13	20	<3	<5	<5	<5	<5	4	4	4	1	2	5	5	1	4	5	4	1	1	2	5	4	1	2	5	3	2	5	3	5	2	4
7	21	F	Single	BBA Second	2	2	0	T. Olanzapine 15 mg T. Risperidone 4 mg C. Prodep 40 mg	10	90	68	13	15	30	63	95	100	10	26	5	<5	<5	<5	4	4	2	4	3	2	3	4	2	4	2	3	4	2	2	3	4	1	4	2	3	1	5	4	3
8	53	F	Married	BSc Botany	4	1	2	T. THP 2 mg T. Risperidone 6 mg	<5	<5	17	19	25	30	42	95	100	<5	12	95	<5	<5	<5	5	5	2	3	4	4	4	4	4	4	4	2	3	4	4	4	4	5	5	5	4	4	5	5	5	3
9	46	M	Married	5th Std	5	4	0	T. THP 4 mg T. Risperidone 6 mg	25	10	<3	<3	40	20	29	5	27	<5	7	<5	<5	<5	<5	3	3	2	3	3	2	3	4	3	4	4	4	4	4	3	3	4	4	4	4	4	4	3	4	4	2
10	40	M	Single	10th Std	15	14	3	T. THP 4 mg	5	10	22	28	70	50	74	60	57	60	86	40	<5	<5	<5	5	5	1	4	4	3	5	5	4	5	3	5	5	4	4	5	5	5	4	4	5	4	2	5	5	4	1
11	60	M	Married	7th Std	1	1	0	T. Quetiapine 300 mg	10	50	67	67	70	85	74	<5	3	95	65	80	<5	<5	<5	2	5	1	4	2	4	5	4	4	4	5	2	3	5	3	5	4	4	3	5	3	3	5	4	5	1
12	31	F	Married	8th Std	7	4	0	Inj. Fluphenazine Decanoate 25 mg Once in 2 weeks	10	20	35	22	15	60	93	95	32	40	4	20	<5	<5	<5	3	2	4	5	4	4	4	4	4	3	4	3	4	4	3	4	4	3	4	3	4	2	3	4	3	2
13	35	M	Divorcee	10th Std	10	4	0	T. Olanzapine 15 mg	70	95	17	9	50	75	71	60	33	40	72	10	<5	<5	1	3	4	5	1	1	5	1	3	5	5	5	5	5	1	5	5	5	4	1	1	1	1	5	4
14	25	M	Single	Diploma	6	2	3	T. Olanzapine 10 mg T. Risperidone 6 mg	<5	<5	28	27	<5	50	63	40	45	20	32	95	15	10	3	4	3	3	4	5	4	4	3	4	4	3	3	3	3	5	4	4	4	4	3	3	5	4	4	3
15	23	M	Single	B.E	3	2	2	T. THP 2 mg Inj. Fluphenazine Decanoate 25 mg Once in 2 weeks T. Risperidone 1 mg	40	75	<3	10	75	80	90	5	13	10	3	90	20	20	4	4	2	3	3	3	4	4	4	3	4	3	3	3	3	3	4	4	3	4	4	4	4	3	4	4	4	3
16	43	M	Single	8th Std	6	2	1	T. THP 4 mg Inj. Haloperidol Decanoate 100 mg once a month T. Risperidone 3 mg	<5	<5	<3	13	40	40	71	20	33	5	17	20	25	25	4	4	3	2	4	5	5	5	3	4	3	3	4	4	5	2	4	4	4	5	4	4	4	3	4	4	1
17	32	M	Single	BSc Chemis	7	2	1	T. THP 6 mg Inj. Fluphenazine Decanoate 50 mg Once in 2 weeks	<5	<5	<3	<3	10	40	76	5	6	5	15	10	<5	<5	4	4	1	3	4	5	4	3	4	4	3	4	3	3	3	4	4	4	4	3	4	4	3	4	3	4	4	1
18	40	M	Single	MBBS	7	7	2	T. Quetiapine 200 mg T. Risperidone 6 mg T. THP 4 mg	30	40	14	18	70	80	97	95	6	95	3	5	30	15	4	4	2	2	4	4	4	4	4	5	4	4	3	3	4	4	4	4	4	5	4	4	4	4	4	4	4	2
19	38	M	Married	8th Std	11	11	3	T. Lorazepam 4 mg T. Risperidone 3 mg T. THP 6 mg T. Glycinorm 40 mg BD	50	75	<3	13	10	40	45	<5	27	5	38	50	<5	<5	4	4	3	3	4	4	3	4	4	4	4	4	4	4	3	4	4	4	4	4	4	3	4	4	4	4	2
20	58	F	Married	5th Std	5	5	2	T. Amlong 5 mg T. Risperidone 4 mg	25	20	3	<3	60	40	39	30	54	<5	17	<5	<5	<5	4	4	3	3	3	4	4	4	3	4	3	3	4	4	4	4	4	3	4	4	4	3	4	4	4	3
21	38	F	Married	B. Com	2	8 months	0	T. THP 2 mg	50	40	<3	<3	40	60	30	10	10	20	39	95	<5	<5	2	2	3	3	2	3	3	4	3	3	4	4	4	4	3	4	4	4	4	4	4	4	3	4	4	4	1
22	41	F	Married	10th Std	10	10	1	T. Olanzapine 15 mg	<5	<5	<3	22	10	30	53	40	61	25	50	60	<5	<5	4	4	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	3	4	4	4	2
23	51	F	Married	11th Std	4	5 months	0	T. Risperidone 4 mg	25	20	28	34	70	40	85	95	100	<5	<3	40	<5	<5	5	4	1	4	5	5	4	4	4	5	4	5	4	4	4	4	4	4	5	5	5	4	5	5	5	5	1
24	38	M	Divorcee	MCA	8	8	1	T. Olanzapine 15 mg	30	75	87	83	<5	40	97	95	100	50	79	50	<5	<5	4	4	3	4	2	3	4	4	4	5	4	4	4	4	4	3	2	4	4	4	4	4	3	4	4	4	2
25	28	F	Single	MCA	3	2	1	T. Risperidone 1 mg T. Aripiprazole 20 mg	50	90	29	40	30	75	90	95	100	75	90	95	<5	<5	5	4	3	2	4	4	5	5	4	5	5	3	3	4	4	4	4	4	4	3	5	5	5	5	3

S.No	Age	Sex	Marital status	Education	Epdisodes of illness	Duration of treatment (years)	No. of hospitalizations	Treatment details	YMRS	HDRS	AVLT-DR	AVLT-LTPR	DVT	DST	Animal naming test	COWA test	In	Stroop test	1.Back	1.Back error	2 Back	2 Back error	CFT-Copy	CFT-Immediate	CFT-Delayed	WHOQOL																					
																										1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	48	F	Married	5th Std	10	2	1	T. Lithium 1200 mg T. Quetiapine 350 mg			<5	<5	5	24	19	15	60	100	95	61	<5	25	<5	<5	<5	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	4	4	2
2	28	M	Married	5th Std	5	2	5	T. Lithium 1200 mg T. Haloperidol 5 mg T. THP 4 mg T. Lithium 1200 mg			<5	<5	10	3	<3	85	70	82	40	23	30	48	<5	<5	<5	3	4	4	4	4	3	3	3	3	3	3	2	2	2	4	4	3	3	4	4	1	4	4	4	3	3
3	32	M	Single	BA	4	4	2	T. Olanzapine 7.5 mg			10	25	10				70									3	4	1	5	5	3	3	3	5	5	3	5	5	5	5	5	5	5	3	5	1	2	3	4	4	1
4	33	M	Single	7th Std	4	3	3	T. Divalproate Sodium 1000 mg			20	20	15				85									3	3	3	5	4	4	5	4	4	3	5	3	3	2	3	4	5	5	4	4	2	3	4	5	3	2
5	33	F	Married	8th Std	3	1.5	3	T. Olanzapine 10 mg T. Lithium 1200 mg T. Quetiapine 25 mg T. THP 2 mg T. Glycomet SR HS T. Glycinorm M80 OD			65	22	76				20									3	4	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4	3	5	4	4	4	5	4	5	4	5	2
6	43	F	Married	MA English	5	3	2	T. Storvas 10 mg			<5	<5	10	<3	6	10	15	43	10	16	<5	19	<5	<5	<5	4	4	3	2	4	2	4	3	3	4	3	5	2	3	4	4	5	3	4	4	4	3	4	4	5	2
7	42	F	Separated	SSLC	8	23	4	T. Divalproate Sodium 1000 mg T. Risperidone 3 mg T. Lithium 800 mg T. Quetiapine 100 mg T. Eltroxin 50 mcg T. Metformin 500 mg			10	90	10	<3	6	10	30	40	30	21	25	43	60	15	5	<5	<5	<5	4	4	2	4	3	3	3	4	4	3	3	4	4	4	3	4	4	3	4	4	3	2	3	4	4	4	2
8	50	F	Married	Lab technic	4	10	1	T. Gliclazide 40 mg BD			<5	<5	<5	<3	24	50	30	53	95	100	75	94	95	95	15	10	4	5	1	2	4	5	4	5	5	4	4	4	4	4	4	4	5	5	5	4	4	4	4	4	5	4	5	1
9	20	M	Single	10th Std	2	2	2	T. Lithium 1200 mg			10	95	<5	<3	12	25	70	77	95	45	5	19	95	<5	<5	<5	3	2	4	5	1	3	4	5	4	3	5	4	4	4	5	5	3	3	2	2	3	5	4	5	4	2
10	28	F	Separated	BSc Maths	2	0.5	0	T. Risperidone 4 mg			10	10	61	60	30	30	40	100	<5	16	75	10	95	95	25	20	<5	1	3	2	5	3	3	5	2	4	4	5	5	1	5	4	1	3	3	4	1	1	1	1	5	5	4
11	22	M	Single	Mechanica	2	3	2	T. Lithium 1200 mg			10	10	23	94	90	90	40	100	95	<3	50	21	95	95	20	10	4	5	1	1	5	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	5	4	4	1
12	34	F	Married	B.Com	5	9	1	T. Lithium 1000 mg T. Quetiapine 500 mg			15	15	46	27	94	95	40	33	20	<7	4	<3	95	95	20	20	4	4	2	1	3	5	5	4	5	5	3	4	4	4	5	4	4	5	5	3	4	4	4	4	2
13	37	M	Married	10th Std	3	10	3	T. Lithium 1200 mg T. Olanzapine 2.5 mg			<5	<5	6	13	60	60	75	32	60	73	5	28	95	95	<5	<5	3	3	2	5	3	3	5	4	5	5	1	4	4	2	5	2	3	3	5	5	1	5	5	5	3
14	48	F	Married	SSLC	3	10	0	T. Divalproate Sodium 1000 mg T. Olanzapine 2.5 mg T. Lithium 800 mg T. Risperidone 6 mg			<5	<5	30	27	25	15	30	57	30	54	20	39	95	95	<5	<5	4	4	1	4	3	4	4	4	4	4	5	5	4	4	3	3	4	4	5	4	4	5	4	4	4	2
15	31	F	Married	BA Tamil	2	0.25	1	T. THP 4 mg T. Divalproate Sodium 1000 mg			<5	<5	<3	<3	<5	30	<3	95	40	100	5	10	<5	<5	<5	<5	4	4	3	4	2	2	4	4	4	4	4	3	4	4	4	4	4	4	4	3	4	4	4	4	4	2
16	34	F	Married	6th Std	6	6	5	T. Olanzapine 2.5 mg T. Divalproate Sodium 1000 mg T. Oxcarbazepine 300 mg T. Quetiapine 300 mg			10	40	<3	84	<3	5	70	100	40	61	40	79	60	<5	<5	<5	<5	4	4	3	2	3	4	3	4	4	4	3	4	3	3	4	4	4	3	3	4	4	4	4	4	4	1
17	54	F	Married	BA	20	23	5	T. THP 4 mg			60	40	80	30	40	30	85	80	###	100	5	85	55	<5	<5	<5	<5	4	4	3	3	2	3	3	3	4	3	4	4	4	4	3	4	3	3	4	4	4	4	4	4	4	3
18	22	F	Married	12th Std	3	4	1	No drugs T. Lithium 1400 mg T. Risperidone 3 mg			90	80	30	90	40	80	95	74	95	57	3	10	95	<5	<5	<5	<5	4	3	3	4	3	3	3	4	4	4	4	4	3	4	4	4	3	4	4	3	4	4	4	3	3	4	3
19	45	M	Married	7th Std	4	6	2	T. THP 6 mg			15	<5	10	<5	11	<3	95	74	20	<5	57	3	7	7	10	<5	<5	<5	<5	<5	<5	<5	3	3	2	3	4	4	3	4	4	3	3	3	3	3	3	4	4	4	4	4	3	4	4	2
20	34	M	Single	5th Std	3	3	3	T. Lithium 2200 mg T. Divalproate Sodium 1250 mg			10	<5	10	<3	13	9	50	15	20	<5	20	<5	7	7	15	<5	<5	<5	<5	<5	<5	<5	3	4	2	3	2	1	3	4	4	4	4	3	4	3	4	5	5	4	4	4	5	2	4	4	4	4	3
21	39	F	Married	B.Com	3	1	1	T. Quetiapine 100 mg			25	<5	10	<5	20	<5	85	43	10	<5	70	13	60	15	<5	<5	<5	<5	<5	<5	<5	<5	4	4	2	3	4	5	3	2	3	2	3	3	3	4	4	4	3	3	3	4	4	4	3
22	20	F	Single	12th Std	3	6	1	T. Risperidone 2 mg			25	<5	97	3	22	28	90	84	5	13	7	10	95	60	15	<5	<5	<5	<5	<5	<5	<5	4	4	2	3	4	4	3	4	4	4	4	3	3	4	4	5	4	4	4	3	3	2	3	4	2	3
23	38	M	Married	9th Std	6	4	0	T. Thyroxine 100 mcg T.Divalproate Sodium 2000 mg T. Haloperidol 15 mg T. THP 4 mg T. Topiramate 100 mg			15	40	20	<5	7	15	60	90	5	10	20	7	95	<5	<5	<5	<5	3	5	1	4	4	3	5	3	4	5	5	3	5	3	5	5	5	5	5	3	5	3	4	5	5	1
24	35	M	Single	9th Std	4	5	4	T. Sertraline 50 mg			25	<5	40	<5	60	9	60	15	80	50	95	5	40	3	33	40	38	<5	<5	<5	<5	<5	<5	3	3	4	4	4	5	5	4	5	4	4	3	3	3	4	5	5	5	3	4	4	4	4	4	3
25	31	M	single	12th Std	3	3	2				25	<5	40	<5	60	9	60	15	80	50	95	5	85	40	###	33	55	38	95	<5	10	<5	<5	<5	4	4	4	4	4	5	5	4	4	4	4	4	5	5	4	4	4	4	4	5	4	4	4	4	4	4